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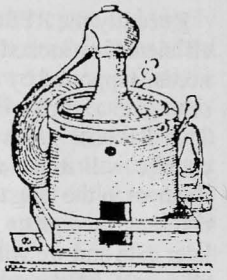

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Diary

Wednesday 13 March 2002
Foundation Lecture 'Researching the early history of Burroughs Wellcome' by Prof. Roy Church, professor of business history at Norwich. At Lambeth.

Friday 12 to Sunday 14 April 2002
Annual Spring Conference 2002
The Conference will be held at the St Mellon's Hotel near Cardiff. A visit to the new National Botanic Garden of Wales is planned. Details have been circulated to members.

8 May 2002
'Opium in the Fens' by Dr T Hunt.

13 November 2002
A Visit to the Society of Apothecaries

Message from the President of BSHP Dr Peter Worling

BSHP and the Royal Pharmaceutical Society

As members of the Royal Pharmaceutical Society will be aware, the RPSGB is at the beginning of an extensive modernisation programme. This is in response to the changing needs of pharmacy and the future opportunities and threats that face the profession.

The 'NHS Reform and Health Care Bill' which is going through Parliament and the provision within this Bill for setting up a Council for the Regulation of Health Care Professionals to oversee all health regulatory bodies puts considerable pressure on all of these organisations to examine and revise their systems of self regulation. This is particularly the case with RPSGB, which holds a unique position within the health care professions as it is responsible for the functions of a regulatory body and a professional body. Pharmacists are members of a Society which protects and furthers their interests and registrants of an organisation responsible for their registration, education and discipline. The future of this structure and the best form and function for the RPSGB is the subject of the present debate and it will be some time before this is finally resolved.

The Council of the Royal Pharmaceutical Society have decided that the changes to the Society's form and function must be given priority. The Government, in responding to the Kennedy report into the Bristol Royal Infirmary children's heart surgery case, have made it clear that the regulatory function must concern itself with safety, quality, standards and competence, in addition to discipline and poor performance. This will entail an increase in the costs of carrying out these functions and any savings that need to be made to meet the forecast budget for 2002 have to be introduced at once. As a consequence of this the grant made by the RPSGB to the BSHP has been withdrawn. This gives us the opportunity to consider our role and the future organisation that will best meet our needs.

The British Society for the History of Pharmacy was formed from the History of Pharmacy Committee of the Pharmaceutical Society. Its brief was to develop teaching and research into the history of pharmacy. It was believed that this could be best brought about by a separate body which could have pharmacists, historians and other non-pharmacists as members and contributors to its work. Our Society has continued to have close relations with RPSGB. Initially, in 1967, members of the Pharmaceutical Society's Council served on the inaugural committee. The offices and the secretariat were provided by the Pharmaceutical Society and our meetings at Bloomsbury and Lambeth have taken the form of joint meetings.

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Recently the RPSGB decided that it would be more efficient if we looked after our own office and secretarial needs, supported by a grant from them. This led to our setting up a secretarial office using third-party support. This RPSGB grant has now been withdrawn. This change will make a fundamental difference to our finances in the long term. However we do not intend to take any precipitate action which we may regret at a later date and we will take this opportunity to consider all aspects of our role and our expenditure.

One change we can consider is to sever our links with the RPSGB at Lambeth and run separate meetings. One of our most important responsibilities is to encourage and support the teaching and research in the history of pharmacy. It is also where the greatest effort is needed. There is very little teaching of pharmacy history in our schools of pharmacy and we fall well behind many Continental countries. As a result, research in the subject is also at a low point. Although there are historians who are working on medical research, little work is being done in the Universities by pharmacists. The two subjects are inter-linked and as the RPSGB will continue to have a responsibility for education and training of pharmacists we must maintain our close links with them if we are to properly fulfill this role.

Providing the *Pharmaceutical Historian* is a major part of our expenditure. It is also the main benefit we offer to many of our members. It is intended to continue publishing this quarterly and to seek ways of improving its impact and content. It may be that we should publish papers from a wider circle of authors and disciplines and all aspects will be considered.

Through our corporate membership of the International Society for the History of Pharmacy and the British Society for the History of Medicine all our members can now take part in their conferences and meetings. It is hoped that you will be able to take the opportunity of attending these functions, including the International Conference. We shall keep you informed of the various activities open to you.

We are determined to continue to develop our Society and to ensure that it plays its part in the furtherance of our common aims. We will be forced to make some changes. Our annual subscription will have to be increased to cover the shortfall in our income. We believe our members will continue to give us their essential support. We appreciate that we must respond to our members' needs and we would welcome any suggestions and ideas on how you would like your Society to develop. We would be particularly interested in how you believe our aims of furthering teaching and research in the history of pharmacy can be achieved, how we can interest a wider public in our work and how we can increase the number of members. We will report on the up to date position at our Cardiff conference in April and it is hoped that as many members as possible will make the effort to attend and give their views.

Peter Worling

Pharmacy in Malta under the French (12 June to 1 September 1798)

John J Borg

On 9 June 1798, the French arrived off Malta,[1] and on 12 June, Malta fell to the French under Napoleon Bonaparte, after the capitulation of the Knights of the Order of St John of Jerusalem.[2] The first thing Napoleon did on landing in Malta was to issue a number of orders,[3] by means of which he gave the people of the Maltese islands a new constitution. The Administration of the island was left in the charge of a Commission of Government[4] under the General Commander-in-Chief,[5] who was specially charged with the administration of Government, the superintendence of taxation and the public health sector.[6]

The total number of pharmacies on Malta probably did not exceed thirty-two. Six were situated in Valletta, one of which was the pharmacy of the Holy Infirmary, two in Senglea, and two in Bormla.[7] Three more were situated in Rabat, and Luqa, two in Cospicua, one in Floriana, and the remainder in Tarxien, Mqabba, Zejtun, Qormi, Birkirkara, Zebbug and Mosta.[8] The population of Malta and Gozo averaged 100,000 and approximately 30,000 civilians lived in the Three Cities (Senglea, Bormla, Birgu) and Valletta. The remaining 70,000 occupied the rest of the island and Gozo. This meant that every pharmacy had an average possible clientele of 3,000 patients.

The French Government of Malta did not issue any amendments to the laws governing the practice of pharmacy, and the old laws were to be observed until modified. Other legislative changes which the Government issued affected pharmacists indirectly. For example, the Justices of Peace[9] were vested with full powers in both civil and criminal proceedings, and they were to judge cases without appeal. Such cases involved the fees charged for medications dispensed by the pharmacist, as well as doctors' and lawyers' fees.[10]

The daily activities of pharmacists under the short period of French rule were identical to what the situation had been half a century earlier under Knights. On 18 June 1798, an order issued by the French Government stated that the Holy Infirmary and its dispensary were to be organised on a new basis, and that the hospital's finances would be obtained from the properties belonging to suppressed monasteries and foundations. The revenue carried from these institutions was presumably used in part to purchase drugs from Sicily. On 19 June an order issued by General Vaubois stated that a 3rd Class French pharmacist *Seguier* would become the chief pharmacist of the Dispensary at the *Grand Hôpital*[11] (Holy Infirmary).[12] The pharmacist as well as the Physician-in-Chief (Dr Robert) and army surgeons were to be housed on the ground floor of the Auberge de Bavière.[13]

The Dispensary of the *Grand Hôpital* had a

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laboratory attached to it by 1798, but according to Dr Robert, it was too small for the preparation of medications in an efficient and comfortable way, whilst the drug store was inadequately stocked, humid, and dark. No actions were taken to improve the situation. This is perhaps understandable in view of the fact that in September the Maltese rose in revolt against their new overlords. The revolution dragged on for almost two years.[14]

Pharmacy during the uprising of the Maltese under the French

On 2 September 1798 the Maltese population rose against the French, under local leaders.[15] This revolt was successful, but suffering throughout the islands was diffuse and many Maltese lost their lives.[16]

A description of retail pharmacy distribution has already been given, but it is important to keep the state of affairs in mind. The French were blockaded in the 'City of Malta' (Valletta, and the Three Cities) on the same day the revolt broke out. During the blockade, important events took place in the hospital pharmacy. As the *Grand Hôpital* was reserved for the French troops, male civilians were transferred to the *Ospedaletto*, and in the beginning of 1799 male patients were again transferred to a new hospital, the Civil Hospital for Men at Valletta. This hospital had a dispensary which was previously occupied by the choir of the Convent of St Catherine. Crude drugs were obtained from the dispensary of the *Grand Hôpital*. These were in turn extemporaneously prepared by the hospital pharmacist on request of the surgeon or physician.[17]

In notes written on the resources of the division of the army in the port of Malta by the Civil Commissioner Règnaud de St Jean D'Angley, the Commissioner claimed that '*l'Hôpital, où il n'y a pas une chemise, pas de draps, pas de drogues*' (The Holy Infirmary does not have a shirt, linen or drugs).[18] During the blockade importation of drugs was made impossible and as a result, the drug stores were drastically depleted. This was due to the naval blockade effected by the British and Portuguese. Drug stores increased in January 1799 when the ship *La Boudese* entered the Grand Harbour with a consignment of crude drugs from Toulon. Although hardly any help arrived for the French during these two years, good administration by the hospital pharmacists, under strict control of General Vaubois, led to their stores lasting till August 1800.[19]

On the other hand, the Maltese insurgents outside the 'City of Malta' were deprived of access to the dispensary of the Holy Infirmary and the hospital for women in Valletta. The only hospital dispensary they had access to for free medicaments was the dispensary of Santo Spirito. Other provisional hospitals with their dispensaries were set up at Tarxien, Zabbar, and Zejtun (*id-dar tal-Isqof*). During the blockade Mariano Agius, the hospital pharmacist of Santo Spirito, used to prepare and supply all medicaments required during the revolt, at a standard price determined by a contract between himself and the Maltese provisional Government. He also used to supply the *Saura Hospital* and the *Grande Ospedale* with medicaments of any nature ranging from different plasters to 3% zinc sulphate. At the end of the revolt he was dismissed from his job and awarded over 1,000 *Scudi* in recognition of his services.[20]

Drugs for the Maltese were supposed to have been imported from Sicily and the Neapolitan States, where a credit facility to the Government of Malta was set. This loan had to be paid in kind, as cotton. In actual fact, few ships were sent with provisions from the Kingdom of the Two Sicilies. Thus, British ships used to cruise around the Maltese island in order to intercept any passing vessel and confiscate their cargoes. In this way the drug stores of the pharmacy of Santo Spirito were sometimes replenished.

Drugs most commonly used during the uprising

The following were some of the remedies employed for slight injuries of patients treated at Santo Spirito hospital and at the battalions of Tarxien, Zabbar, and Zejtun during the Maltese uprising: cotton paste, pads, bandages, lead plaster, diaplalma plaster (ordinary lead plaster with 3% zinc sulphate), white ointment, lead ointment, d'arsos balsam, Goulard's and other lead extracts, liquor anodynus, 'septic' water, vinegar, compound camomile water, and honey.

On the other side of the battlefield, in the 'City of Malta', similar pharmaceutical preparations were made and dispensed. Vinegar was the most commonly used medicament during the uprising, as it was considered to have miraculous properties that cured almost everything. It is interesting to note that a local sea-weed became very popular as an anthelmintic for the infestation by the roundworm *Ascaris lumbricoides*. This condition was usually treated with infusions or other galenical preparations of Corsican moss. However, as the rush for Corsican moss soon exhausted the imported supplies, the native sea-weed known as *zerrighet il-hniex* began to be eaten crude with vinegar and oil.[21]

Pharmacy legislation during the uprising

If any legislation was passed by the French government during this period, it was definitely not enforced,[22] as the war produced so many problems such as a shortage of food (even rats were being eaten as a source of nutrients!), a shortage of drugs, overcrowding, and poverty. Therefore it was up to the pharmacist and his conscience to properly abide by the profession's demands.[23]

Outside the 'City of Malta' legislation made by the French Government was ignored by the Maltese Commission (which was in charge of the island and the Maltese during the blockade). Furthermore, the Legal and Civil Institution functioning during the blockade under Captain Alexander Ball could hardly

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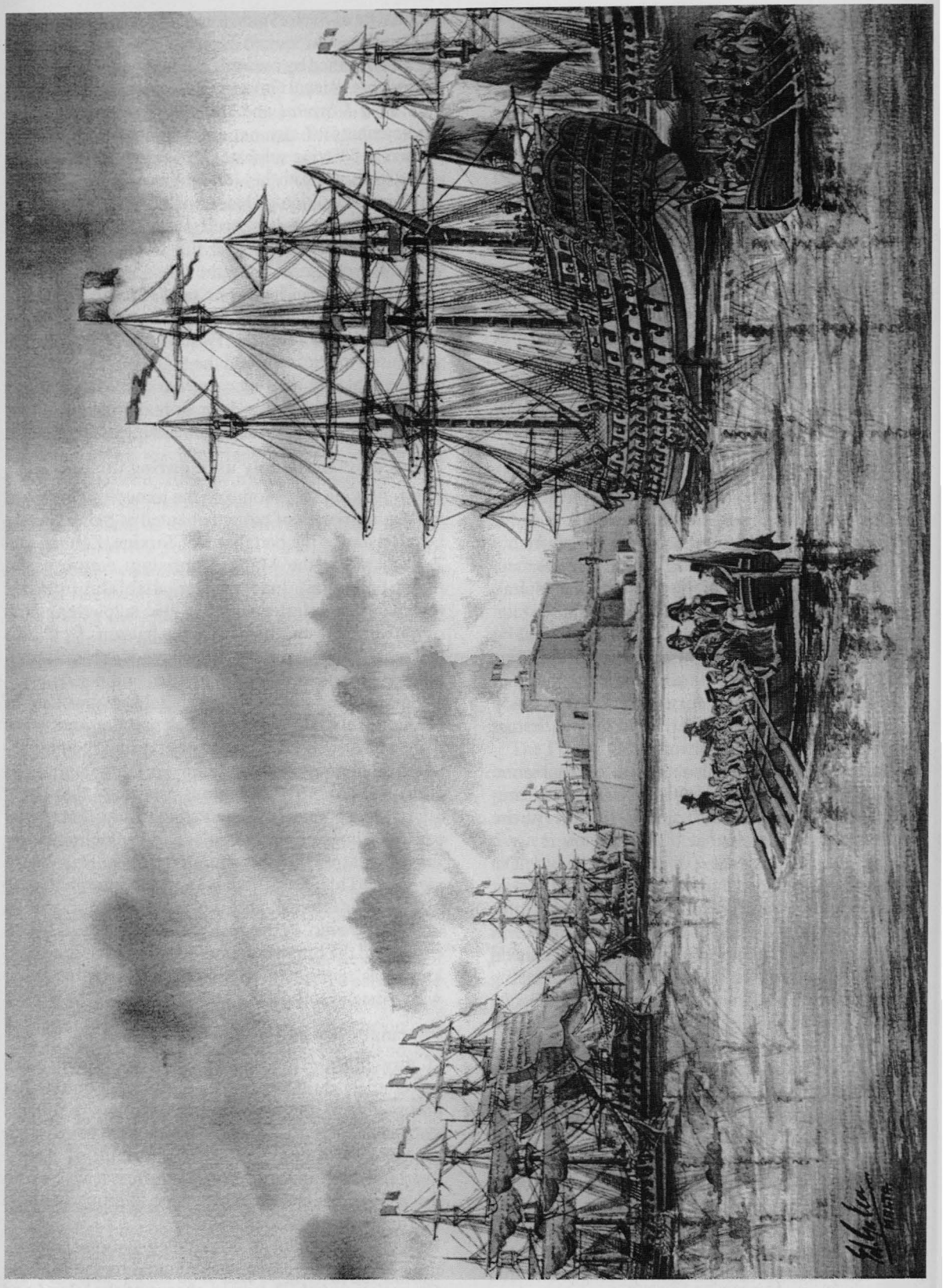

Napoleon at Malta: Napoleon being rowed from his flagship *L'Orient* in Grand Harbour on June 12, 1798. From an artist's impression by Edwin Galea. Courtesy Stuart Anderson

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regulate and control[24] pharmacists and the 22 pharmacies situated outside the 'City of Malta'.

Pharmacists during the uprising

Nearly all the pharmacists present in Malta were practising either in hospital or community pharmacy, but during this period some pharmacists were active politically. One pharmacist was Stanislas Gatt, who first held a public office under the French but later turned against them. In 1798 he became the President of the Blockade Committee and Commander of the Qormi Battalion. He tried to provide money for his battalion's granary stores but had incurred heavy financial losses during the uprising. He added his signature to a letter sent to the King of the Two Sicilies asking for help in the uprising. Gatt was awarded a silver medal by the British Commission for his valuable work during the blockade.

Another pharmacist who was politically active during this period was Mr Clemente Mifsud Bonnici, a pharmacist from Zejtun.[25] During the rising he was one of the leaders of the mob who liberated Mdina on 13 September 1798. Other pharmacists who were politically active and patriots during this period included Francisco Pisani, who had a pharmacy in Senglea, Emmanuel Fenech from Gozo, and Fortunato Vella from Mosta.[26]

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Endnotes and References

1. Preparations to capture Malta had been in Napoleon's plans since 26 May 1797, when he wrote to the Executive Directory of France to seize Malta. In fact, Bonaparte knew that the Maltese people were fed up with the Knights, that every Knight was a sovereign and tyrant and that Maltese women were being raped and taken away from their husbands. Justice did not prevail, and if a guilty person was a Knight's *protégé* there was no way in which this person could be brought to justice. Moreover, the Maltese Nobility was in favour of a French invasion, and thought that only 500 Knights could defend the island, out of which over two hundred Knights were French. The Grand Master, Ferdinand Hompesch, was a peaceful man and unsuitable to the task of leading the Maltese against the French.
The French invaded Malta with the 'Army of the East' which was made up of 49,608 men recruited from Marseilles, Genoa, Civita Vecchia, and Toulon. This great armada was offered no resistance in Malta, and hardly a shot was fired. All these events are well explained in William Hardman's: *A History of Malta during the Period of the French and British Occupations 1798-1815.*
2. Denaro, V.F. The French in Malta. Scientia 1963; XXIX, 1 (Jan): 12.
3. Hardman, W. The French Government of Malta. In: Holland Rose, J., Ed. *A History of Malta during the Period of the French and British Occupations 1798-1815.* Facsimile edn, Malta: Midesa Books Ltd, 1994: 74-104.
4. The Commission consisted of nine persons nominated by the General Commander-in-Chief. It was divided into two bodies, the Bureau and the Council. The Bureau consisted of two members and a president whilst the other six people formed the council who used to nominate every six months the two members of the Bureau. As the Bureau was a full time enterprise the members used to receive an annual salary of 4,000 Francs.
5. Claude Belgrand, Comte de Vaubois, was given command of the division of the permanent garrison of the islands of Malta and Gozo, by the Commander-in-Chief of the Armada of the East, General Napoleon Bonaparte.
6. Note that the period of substantive French Government lasted only for three months from 12 June 1798 to 2 September 1798, due to the uprising by the Maltese on 2 September 1798.
7. Cassar, P. Pharmacies and Apothecaries One Hundred Years Ago in Malta. Journal of the Malta Union of Pharmacists 1967; 1(2): 28.
8. Borg, J. Pharmacists of Old. The Pharmacist-Journal of the Chamber of Pharmacists-A Trade Union 1982; 4 (July): 14-19; Pharmacists of Old. *ibid.* 1983; 5 (Jan): 16-23.
9. As Malta was divided into twelve Municipalities, Napoleon ordered that there should be twelve Justices of the peace for each Municipality. An example of one Municipality is Notabile consisting of Mdina, Rabat, and Dingli.
10. See Reference 2; 73-75.
11. On 16 June 1798 an order was issued reserving the Holy Infirmary for the exclusive use of French troops. In accordance with this order the hospital was turned into a military hospital and civilian patients had to be treated by the hospital for females, the *Ospedaletto.* The Infirmary became known as the '*Grand Hôpital*' and its clinical direction was entrusted to the Physician-in-Chief Dr Robert.
12. Scicluna, H.P. Acts and Documents Relating to the French Occupation of Malta in 1798-1800. Arcivum Melitensae 1939; 9 (Sep): 195.
13. Critien, A. On Short Commons: Sidelights of the Maltese Insurrection against the French (1798-1800). Scientia 1950; XVI; 2 (April): 90.
14. Cassar, P. *Medical History of Malta.* London: Wellcome Historical Medical Library, 1964: 586.
15. A full description of the uprising of the Maltese against the French is given by William Hardman in Reference 3: *A History of Malta during the period of the French and British occupations 1798-1815.* The local leaders were the notary Saverio Zarb, of Attard, and notary Emmanuele Vitale. The reasons which led the Maltese to rise against the French were various. One main reason was the news of the disaster of the great French fleet at Aboukir Bay. Another was the increase in interest rates on *Monte Di Pieta* loans (this was an institution which used to lend poor people money at a very cheap interest rate of 4° %). Moreover, many Maltese soldiers were not being paid by the French Directory in France, Maltese churches were being ransacked, monasteries closed down and church property seized.
16. Critien, A. On Short Commons, Sidelights of the Maltese Insurrection against the French (1798-1800)'. Scientia 1950; XVI; 1 (Jan): 9-24.
17. Cassar, P. *Medical History of Malta.* London: Wellcome Historical Medical Library, 1964: 586.

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18. St Jean D'Angely, R. Notes sur les Ressources de la Division de l'Armée et du Port du Malte. In: Holland Rose, J., Ed. *A History of Malta during the Period of the French and British Occupations, 1798-1815*, Facsimile ed. Malta: Midesa Books Ltd, 1994: 105.
19. Critien, A. On Short Commons: Sidelights of the Maltese Insurrection against the French (1798-1800). *Scientia* 1950; XVI; 1 (Jan): 9-24.
20. Critien, A. On Short Commons, Sidelights of the Maltese Insurrection against the French (1798-1800). Scientia 1950; XVI; 4 (Oct): 161-167.
21. *Ibid*., 161-168.
22. According to V. Denaro in his article 'The French in Malta', old laws were kept if new ones were not issued. However, G. Borg in his article 'The Influence of the Laws of England on Maltese Legislation', Scientia 1942; VIII; 2 (Apr): 51, states that 'The commander whom Napoleon left behind, immediately started the task of introducing the new institutions which were the result of the French Revolution, abolishing all legislative enactments which had been gradually introduced by the Grand Masters and to which the Maltese had long adapted themselves'. In William Hardman's authoritative book (Reference 3) no laws were published regarding the practice of pharmacy directly.
23. Since the 1450s, pharmacists were always considered to be professionals in Malta. However, pharmacists in England were only considered to be professionals in 1852 when the first Pharmacy Act was enacted.
24. The provisional government set up during the blockade had civil powers over all civil affairs; its main function during the blockade was to ensure enough provisions for the Maltese population and other day-to-day disputes between the Maltese.
25. Borg, J. The first recorded Pharmacists in the Maltese islands. Journal of the Malta Union of Pharmacists 1968; II; 1: 15-18.
26. Cassar, P., 'Pharmacists and Politics in Malta in the 18th and 19th Centuries'. St Luke's Hospital Gazette 1970; V; 1 (June): 37-39.

Review

APOTHEKER-KALENDER 2002 (Calendar for Pharmacists)

By Prof. Dr Wolfgang-Hagen Hein of Frankfurt and Dr Werner Dressendörfer of Bamberg. ISBN 3-7692-2972-X (DAV); Obtainable from: Deutscher Apotheker Verlag, Buchhandlung, Postfach 101061, D-70009 Stuttgart, Germany; €35.

Once again the *Apotheker-Kalender* presents large (48 x 48 cm) pictures of German and French objects and illustrations of pharmaceutical interest. The calendar for September and cover show a painted marksmen's target for a shooting club in which the globe of a retort forms the bulls-eye. The target was given to a club by the pharmacist Remigius Etti in about 1820 and shows a pharmacist's laboratory with the retort and two receivers, ovens and the assistant using a large mortar.

The picture for June is of a painted wooden wedding cupboard dating from 1798, made for a married couple. It represents a 'heavenly pharmacy' and is covered with flowers. On the doors are painted a good recipe against hell. 'Take quantities .. of patience, sadness, moderation, humility etc. and rub it on morning and night.'

Two faience pitchers and a footed apothecary jar from Montpellier are shown for April. There are no drug names as paper tags would have used. These early 17th century vessels are among the earliest in a genuinely French style. Two German albarelli made in Arnstadt in the 17th century represent July. The strong cobalt blue designs have no inscriptions and would also have had a glued label or labelled cover, making them re-usable for other products. In contrast, November shows three wooden drug jars from the City Pharmacy in Brixen, South Tyrol, which is celebrating its 400th anniversary in 2002. The painted jars with wooden lids show signs of having been repainted in more fashionable colours on several occasions. Their inscriptions include pomegranate bark and barleycorn (1686).

February is represented by three small silver containers: the first silver pomander has partitions for aromatic substances such as cloves, canella and rosemary and the second would have held sponges bearing aromatic oils. Both are 17th century German work while the third is a French pill-box from the 18th century decorated with scenes of cherubs.

Illustrations from books make colourful plates. That for March shows the title page of Basilius Besler's 'Continuatio'. This Nuremberg pharmacist (1561-1629) was famous for collecting a cabinet of art and curiosities, shown in a catalogue of 1616. The 'Continuatio', a second edition of 1622, had additional illustrations. The objects shown on the title page are mainly taxidermic items. For August there is an illustration of Kermes ilicis engraved by G.P. Nusbiegel for 'Microscopic delights for the mind and eyes' by Martin Frobenius Ledermüller of Nuremberg in 1761. This book made the use of the microscope a fashionable pursuit. The engraving shows the insect and its gall-like cocoons from which a red dye could be extracted.

A page from a Nuremberg family register of c. 1760 is decorated with a scene from a well-stocked pharmacy where Jesus as the heavenly pharmacist stands next to an earthly pharmacist pounding a mortar. A miniature in a Greek manuscript of the 14th century from the Bibliotheque Nationale in Paris illustrates May with a scene of a doctor and pharmacist treating three patients, while an assistant somehow uses two pestles in a mortar. A photograph of the Detmold Court Pharmacy, as modernised in 1982 from its neogothic predecessor dating from 1859, shows how tastefully an old pharmacy can be updated while displaying the varied original packs of the modern pharmaceutical industry. A watercolour painting dating from 1877 shows the interior of the Lion Pharmacy in Neuruppin, near Berlin, where the German writer Theodor Fontane had spent his childhood in the 1820s.

The calendar has descriptions of the illustrations and their provenance in German and English and reminds us of the rich heritage of our continental European profession. A.W.

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The Changing Role of the Community Pharmacist in Health Promotion in Great Britain 1930 to 1995

Stuart Anderson

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Introduction

This paper provides a brief historical account of the involvement of community pharmacists in Great Britain in health promotion during the twentieth century. Sixty years ago pharmacists in Britain played an important part in advising and counselling their customers on health-related matters. But in many places this role was effectively lost for over thirty years, only becoming re-established in the 1980s. In this paper I explore how community pharmacists came to lose this role, and consider how key factors converged in the early 1980s to again give community pharmacists a role in health promotion. The paper is in three parts. It begins with a brief history of health promotion, continues with an account of the changing role of the community pharmacist, and concludes with a discussion of the factors that brought about these changes.

A brief history of health promotion

The historical context of health promotion is a complex one. Not only do we have to take note of the changing definitions of health promotion over an extended period of time, but we also have to consider the re-definition of the mandate of public health that has occurred since the nineteenth century. In somewhat less than one hundred years this shifted from a concern with environmental health to an emphasis on personal prevention; and from a focus on poverty and health to a focus on lifestyle and risk.

The term 'health promotion' itself is a very recent creation. Its origins cannot be traced back much beyond 1974, when the Lalonde Report entitled 'A New Perspective on the Health of Canadians' was published. Since then there has been a steady flow of initiatives, at both the national and international level. Some of the important milestones in health promotion are summarised in Figure 1.

Figure 1: Milestones in Health Promotion

Year	Initiative
1974	Lalonde Report. *A New Perspective on the Health of Canadians*
1976	*Prevention and Health: Everybody's Business*
1978	Declaration of Alma Ata
1981	*Health For All* (WHO)
1985	Thirty eight Targets for Health in European region (WHO)
1986	Ottawa Charter for Health Promotion
1987	*Healthy Cities* Project
1992	*Health of the Nation* UK
1999	*Our Healthier Nation* UK

It would however be wrong to suppose that before 1974 there was no concern by governments with the prevention of illness rather than the treatment of disease. There were indeed many initiatives concerned with promoting health. But these early initiatives need to be seen in a broader public health context, and in the inter-war years they were dominated by three issues: vaccination; domestic hygiene; and the care of mothers and babies.[1]

The changing role of the community pharmacist

The changing role of community pharmacists in health promotion in Great Britain during the twentieth century occurred against a background of substantial change in the practice and fortunes of community pharmacists during this time. In considering these changes three key time frames can be identified: a period before 1948 characterised as the role of the 'traditional' pharmacist; a period between 1948 and 1982 characterised as the 'disappearing' pharmacist, when the role of the pharmacist was the dispensing prescriptions at the back of the shop; and a period of 're-invention' of the pharmacist during the 1980s and 1990s, a process which included the rediscovery of the pharmacist's role in health promotion.[2]

The 'traditional' pharmacist: community pharmacy before 1948

Throughout the twentieth century the community pharmacist in Great Britain was strategically situated at the boundary between professional and lay care. Here was a readily available source of wisdom and advice about a whole range of health-related issues. Such issues included domestic hygiene, diet and sexual health, and providing advice about them was an integral part of the pharmacist's role in the community.[3] Two extracts from recorded oral histories of community pharmacists illustrate this role. Wilfred Ayers recalls working in a pharmacy in Nottingham in 1935:

> There was for us the constant listening to troubles and the giving of advice. I seem to remember most often I would ask the patient 'and have you told the doctor all that you have told me?', and usually the answer was 'no'. The public expected a great deal from me and my contemporaries.[4]

Alan Kendall recalls the relationship with customers in a pharmacy in Yorkshire in 1938:

> People looked upon the chemist with respect. They would always do as he recommended. I can't remember anyone asking for something different from what was recommended. But it was an age of discipline. People took note of what those in authority suggested.[5]

The traditional pharmacist was an important member of the community, known to all his (or occasionally her) customers, always at the front of the shop, and sometimes even at the front door. Usually, it was the apprentices who were left to get

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on with the dispensing at the back of the shop. But all this changed with the coming of the National Health Service in 1948.

The 'disappearing' pharmacist: community pharmacy 1948 to 1982

A number of major changes to community pharmacy resulted from introduction of the National Health Service (NHS) in 1948. State prescriptions virtually quadrupled overnight, from about 70 million a year to around 250 million. To meet this increased workload pharmacists had little option but to spend much of their working day in the dispensary, particularly since many of the prescriptions still needed to be made up extemporaneously.

Almost all community pharmacists were delighted with this development. Most saw the dispensing of an elegant preparation as what they had been trained to do. Many enlarged their dispensaries at the expense of the shop.[6] Very few chose to take on less qualified assistants or dispensers to undertake the routine dispensing, preferring to do it themselves.

At the same time counter dispensing declined rapidly, since all medicines were now available free of charge on the NHS. Likewise the dispensing of private prescriptions also declined: And the sale of proprietary medicines dipped for a while, although they rose again sharply once television advertising began in the early 1950s.

Thus followed several decades during which the community pharmacist, at least in many places, virtually disappeared from the public's view, and hence their consciousness. The public face of the pharmacy was now the counter assistant, with the pharmacist only appearing grudgingly if the customer insisted on seeing him.

There were other important developments that consolidated this position. With the final shift to university education in 1967 the pharmacist's traditional source of dispensing labour, the apprentice, dried up. New entrants to the profession saw that community pharmacy was about dispensing prescriptions at the back of the shop. A situation that was originally a response to rapidly changing circumstances in the late 1940s had become normalised by the 1960s.

By the late 1970s community pharmacy was in serious trouble. The prevailing concern was epitomised by a statement by the then Minister of Health, Dr Gerard Vaughan, at the British Pharmaceutical Conference in 1981, the same year in which WHO published *Health for All*. He famously stated that:

> One knew that there was a future for hospital pharmacists, one knew there was a future for industrial pharmacists, but one was not sure that one knew the future for the general practice pharmacist.[7]

Community pharmacy 1982 to 1995

Something needed to be done, and the ball was firmly in the profession's court. The greatest need was to remind the public of the existence of pharmacists, and to encourage them to use the pharmacist, and hopefully to begin to restore public confidence in the profession. One of the earliest initiatives was taken by the National Pharmaceutical Association, which in 1982 introduced its 'Ask Your Pharmacist' campaign, involving extensive advertising, particularly in women's magazines. The campaign proved to be a major turning point. The public began to take notice of the campaign, and did start to 'ask the pharmacist'. Some pharmacists were dragged, sometimes reluctantly, out of the dispensary to answer the queries. But this process highlighted some of the difficulties that would have to be overcome if things were to move forward. Over the next ten years these difficulties were overcome, and the various elements slowly came together. These developments are summarised in Figure 2.

Figure 2: Community Pharmacy and Health Promotion

Year	Development
1981	Ask Your Pharmacist Campaign
1982	First pharmacy-based health promotion schemes reported
1982	Pharmacy Advisory Group appointed to Health Education Authority
1986	Nuffield Report on Pharmacy
1986	Healthcare in the High Street campaign
1988	The Pharmacist as Health Educator report
1989	Pharmacy Healthcare funded by government
1994	Payments for 'additional professional services' began

Re-establishing the role in health promotion

In order to make progress in re-establishing the role of the community pharmacist in health promotion it became clear that there would need to be movement on three separate fronts. There would need to be a strong commitment by the profession itself; there would have to be an acceptance of such a role by the public; and there would have to be strong support from external bodies, particularly the government. The profession began the long process of achieving progress along each of these fronts.

Professional Commitment

A key part of the pharmacy strategy was to work closely with external bodies. One group important in influencing pharmacists involvement in health promotion was the Pharmacy Advisory Group of the Health Education Authority, the government agency charged with promoting health.[8]

The first pharmacy based health promotion schemes were reported in the early 1980s. These focused on a number of areas, including smoking cessation, healthy eating, alcohol awareness and the safety of medicines. They were generally small-scale campaigns carried out by a few committed pharmacists on a voluntary basis.

These pilot studies were evaluated and reported in the literature, and were instrumental in showing what

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could be done. The early forays into health promotion were extremely important, for when the report of the Nuffield Enquiry into Pharmacy was published in 1986 it was able to conclude that 'there is a role for pharmacists in health education, in co-operation with other health care professionals'.[9]

1986 saw the launch of the 'Healthcare in the High Street' scheme. This involved the first national distribution of health education leaflets through pharmacies. It was a joint initiative between the Pharmaceutical Society, the Health Education Authority and the Family Planning Association. Topics covered included contraception, AIDS and drug abuse. As with earlier initiatives, this was a voluntary scheme, although the leaflets themselves were usually printed and distributed by charitable organisations.

This experience exposed some of the shortcomings of community pharmacists' involvement in health promotion. A report on 'The pharmacist as a Health Educator' in 1988 identified a number of barriers to greater participation, including lack of training at undergraduate and postgraduate levels, lack of remuneration, and lack of official recognition of these activities.[10]

Government support

At the same time the government was busy developing its own strategy for health promotion. It had been supportive of many of the recommendations about pharmacy made in the Nuffield Report, including the proposed role in health promotion. In due course a role for community pharmacy was mentioned in the White Paper 'Promoting Better Health' published in 1987. This promised funding for the 'Pharmacy Healthcare' scheme, which replaced the earlier 'Healthcare in the High Street' scheme. Central government funding of £250,000 per year was announced in 1989.[11]

But this funding covered only the organisation and running of the scheme, and contained no element of remuneration for those pharmacists taking part. Negotiations on this continued between the Pharmaceutical Services Negotiating Committee and the government. Only in 1994 was payment forthcoming, and this only for a broad package of so-called 'additional professional services'. Pharmacists would receive a payment for such services only if they fulfilled certain criteria, which included the display of a minimum of eight health promotion leaflets.

Public acceptance

A third element in the process of involving community pharmacists in the provision of health promotion services was the public's willingness to use them in this way. In the 1980s this was a significant problem. As the Nuffield Report observed in 1986:

> The Consumers' Association survey showed that few people thought of the pharmacy as a likely source of family planning advice, or for that matter of advice on diet, stopping smoking, how to cope with tension, or checking blood pressure.[9]

But the growth in health consumerism during the 1980s led to public demand for ever more information about both health and medicines. Patient information leaflets about medicines became the norm, and the 'ask your pharmacist' campaign had prepared the public to view the pharmacist as a source of help and advice about health-related matters. Health promotion was a natural extension of this role.

Today there remains an enormous gulf between the public's experience of community pharmacy and the profession' s perception of what it is doing. Market research has shown that the pharmacist's advice on a wide range of health issues is willingly given, but consumers still complain that the consultation has to be firmly requested by the customer rather than being readily volunteered by the pharmacist. Pharmacists, on the other hand, insist that they are readily accessible and available to their customers.

Conclusion

Historical analysis of the role of the community pharmacist in Great Britain in health promotion suggests that three things are crucial to its development. Firstly, there needs to be a strong commitment within the profession itself, a willingness to enter into discussions with external agencies at an early stage, and there must be willingness amongst a small group of pioneers to take part in such initiatives with no immediate prospect of reward. Secondly, the support of government needs to be sought and obtained, to provide formal recognition of a role in this area, and to provide a mechanism for obtaining financial reward. Thirdly, the public needs to recognise the pharmacy as a place where they can obtain health promotion advice, and feel confident in its accuracy and appropriateness.

This paper has described how these factors emerged in Great Britain, such that by the year 2002 the role of the community pharmacist in health promotion is both well established and readily accepted. This rediscovered role in health promotion has been one strand in the development of the so-called extended role of the community pharmacist, which has taken place from the 1980s onwards. This extended role represents at least a partial return to the role practised by the 'traditional' pharmacist prior to 1948.

Finally, this paper has demonstrated how historical analysis of the development of the role of the community pharmacist can play a significant part in illuminating important health policy issues such as health promotion.

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Teaching Pharmacy History: The Antipodean Experience

Dr Rosemary Beresford and Geoffrey Miller

This brief paper covers only some aspects of teaching Pharmacy History from our experience in two of the pharmacy schools in our region. It describes what we, in Australia and New Zealand, have been doing to ensure that the history of pharmacy is a significant part of the education of the pharmacist.

Throughout the world, numerous surveys on the level of trust that the community places in professional practitioners invariably have pharmacists towards the top of the list. The fact that this trust is placed in us by those we serve is sufficient reason to make those who will carry the mantle in the future, understand how their predecessors have earned this trust.

To begin with I am sure that when it comes to having Pharmacy History included as one of the essential subjects in the undergraduate curriculum we have a common problem in that human resources are scarce in most universities and other academic institutions. Support teachers, whether they be trained academics or enthusiastic amateurs, are essential to the continuation of Pharmacy History as a meaningful part of the undergraduate curriculum.

Part of our role as members of the International Society for the History of Pharmacy is therefore to become involved with the halls of learning and to encourage our colleagues to do likewise, so that we are part of an expanding network of people with the skills to ensure that history is interwoven with all the other parts of the knowledge base one has to have to be called a pharmacist.

Today there are already many History of Pharmacy and related resources on the Internet, but one of the difficulties facing the student is where to start and how to distil down the essence of the topic for research.

Web-based resources provide a good stimulus for self-directed learning, and in order to provide a reliable information source for students and teachers in New Zealand, the University of Otago is in the process of developing a website to provide a dynamic resource that is cost effective and can be readily updated and added to, as well as providing ease of access to students both on and off the campus.

Apart from resources, success also depends on the time available for the Pharmacy History segment of the course and at what stage the subject should be introduced.

At the University of Otago, History of Pharmacy has been part of the 2nd year Pharmacy Practice course since 1984, during which time the number of students in a class has increased from 25 to 120.

Significantly, in all of this time the course has been presented by Dr Beresford herself, and naturally it has been modified in both teaching style and content to keep pace with changing numbers and expectations of students as well as the availability of materials.

The School has also been fortunate in that many retiring pharmacists have donated large quantities of medicines, tools, prescription and other old books, so that as well as being used in the classroom, they can furnish the School's museum with a regularly changing display.

At Curtin University however, Pharmacy History was introduced into the fourth year Pharmaceutical Practice unit five years ago when the whole pharmacy course was extended from three years to four.

I sense that the majority of fourth-year students resent the intrusion of extra assignment work at this time in their course, and most would prefer to have history introduced as a first or second year subject.

But the argument against this is that to be able to adopt a critical approach to history some experience of the profession is required, as well as an exposure to the practice side of their education. While we can claim to have a Pharmacy History course segment at Curtin University, the actual teaching time is still limited to approximately six hours in total.

When we first started, the format consisted of four one-hour lectures, a tutorial and a short answer examination. In addition the students were asked to submit a 1500 word essay on a historical subject.

Apart from refining the content of the lectures and

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the lecture notes, no changes were made until 2001.

As a result of much consultation with Dr Beresford, and attendance at seminars she conducted for the Australian Academy of Pharmacy History, it was decided that this year at Curtin we would adopt a fresh approach and try out the model currently being used in New Zealand.

For the last 4 years, her course has been largely workshop based, with the class of 120 students divided into four groups of 30 and subdivided into teams of five who work together though a series of different problems.

To make the subject even more appealing to students, who mostly see this as a relaxing, as well as relevant, part of the course, Dr Beresford has regularly used modern technology as well as dusty old bottles and other artefacts. Students handle old medicines, interview long-retired pharmacists and search through 19th century Pharmacopoeias, and are also encouraged to stroll through the virtual museums in websites located in the United States, Europe and other places. They are required to utilise the technology to produce their own appraisal of a topic that appeals to them These range through an enormous variety of different cultures, diseases and professional developments over many different time periods. Some of the assignments created as a result have been incorporated into Otago's Pharmacy History web site.

Because we have similar student numbers to Otago at Curtin University, dividing the class into groups and then into teams enabled us to remove the examination as the assessment for the unit, and to use the team research technique.

At the start of the first semester, each team chose a topic from a list of 30 suggestions and the task was to prepare a ten-minute presentation for their group. The groups were spread into three classrooms with a moderator in each, and each team presentation was marked partly by the moderator and partly by the rest of the other students in the group.

In addition a written essay similar to previous years, was also required from each team.

Most of the students chose to present their project using PowerPoint or similar projection systems, and one group even went to the trouble of dressing in appropriate costumes to present their chosen topic of Medieval Medicine.

It was obvious that the team project was stimulating to the students, despite a few grumbles, and the work was of good standard with average marks being higher than in previous years.

Ideally, more time is required to make this approach even more effective as an educational tool, and I can see that the topics offered need to be more closely related to the pharmacology of diseases and drugs, as well as allowing for special interests such as traditional Chinese medicine, homoeopathy etc.

To offer a meaningful exposure to the history of pharmacy in such a short timeframe really requires an effective introduction to the aims and purposes of the course. This year the class was given a set of notes to read, but clearly a more stimulating visual presentation to highlight the important areas of the evolution of pharmacy as an identifiable and unique professional service needs to be produced.

Again, a possible solution has come from New Zealand. Just last month the two introductory, overview lectures were given simultaneously to students in the School of Pharmacy in Sydney, Australia, linked across the Tasman by video-conferencing to students in Dunedin. This is really 21st century technology, and was enthusiastically received by both students and teachers

Pharmacy History, despite its academic connotations does provide some opportunities for innovation in teaching methods. I am looking forward to further refining the group project model and await with interest further developments in the video-conferencing experiment.

When the New Zealand website is completed, we are planning to negotiate with the University of Otago to 'Australianise' some of the material, particularly in the area of indigenous medicinal plants.

The history of pharmacy is flourishing at the University of Otago and is beginning to bloom at Curtin University, and whilst in the future we may have a full, Internet-based course, this should always be backed up by hands-on experience of seeing, smelling and touching the books and artefacts of long ago. Only then can the students really appreciate the developments that have taken place in the use of medicines and pharmacy's place in their provision to those who need them.

Perhaps one of the tasks of the International Society for the History of Pharmacy should be to bring together the basic principles of pharmacy history and to be the vehicle by which the experiences of others can be shared. I believe that we should not rest until every university with a Pharmacy school adopts and integrates the common history we all share into the curriculum of studies they offer; we should also be the catalyst for producing texts and other media that can be readily available to all.

Finally I will leave you with this quotation, which has a message to all pharmacists:

> 'Never forget the past, you may need it again in the future.'

This paper was presented by Geoffrey Miller at the Lucerne meeting of ISHP in September 2001.

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Apothecary to Mr Harriot

M. P. Earles

Shopping lists are short-lived documents and, like the insects of the *Ephemeridae*, rarely survive a day. There is however a notable exception among the papers of Thomas Harriot in the British Library.[1] It is a list of items to be purchased from a London apothecary in about the year 1616.

Thomas Harriot, born in Oxford in 1560, was a mathematician and astronomer described by A.L. Rowse as perhaps the most original scientific intellect among the Elizabethans. He was an associate of Sir Walter Ralegh and in 1585 joined Sir Richard Grenville's expedition to found Ralegh's ill-fated Roanoke colony. In 1588. Harriot published *A Brief and True Report of the newfound land of Virginia*[2]

Thomas Harriot (1560-1626)

in which he discussed the flora and fauna, the people and their language. He also commented on the commercially viable commodities that might be expected to bring some return to the investors in the colony, among them 'sweet gums of divers kind and many other apothecary drugs'.

In May 1615 Harriot consulted the distinguished physician Sir Theodore Turquet de Mayerne about an ulcer on the side of his nose. Mayerne's case notes for Harriot are preserved in the British Library and his description of the lesion when taken together with a later report by the physician Alexander Read identifies the ulcer as a basal cell carcinoma.

This condition, known as a rodent ulcer and untreatable at that time, destroys the soft and bony tissues leading to extensive facial disfigurement. Mayerne, following the humoral system of medicine of his time, treated Harriot by bleeding, purgation and with cordial or restorative medicines. In the early seventeenth century facial lesions that did not readily heal were sometimes known as *Noli me tangere* 'touch me not', a term used by John Aubrey when writing on Harriot in his *Brief Lives*, and it may have originated from the observation that many local treatments used at that time aggravated the condition. However, the direction 'touch me not' was unlikely to appeal to patients seeking a cure and Mayerne ignored it when prescribing for Harriot.

The items in the shopping list indicate that Harriot was continuing the treatments initiated by Mayerne. The document does not name the apothecary but circumstantial evidence points to Edward de Pleuro who was Mayerne's apothecary and like Mayerne an 'out stranger' or foreigner. At the time of the founding of the London Society of Apothecaries he was not a Freeman of any City Company and was at the centre of the controversy concerning the proposed membership of the Society. Both Mr D Pleur (*sic*) and Thomas Harriot are mentioned in a notebook Mayerne kept to record prescriptions of special interest. In 1616 Harriot sent a letter to Mayerne through his apothecary and with it a note addressed to Master de Pleuro requesting a small quantity of red mercury precipitate (an escharotic) and some ointment of poplar (*Unguentum Populeon,* an opiate ointment). This request indicates that it was Edward de Pleuro who was supplying Harriot with medicines.

The shopping list is as follows (the letters and figures in bold type are in another hand presumably that of the apothecary):

Tobacco
wax candles
taffeta
shoe strings
x Aqua Sinamoni, a pinte **5s 2d**
x Aqua Spermatis Ranaru 8 ounces **12d**
Aqua phlegmatis Alluminus 8 ounces
x East Indy green ginger 4 ounces **13d**
x Galles for inck half a pound **4d**
x Basilicon unguent 4 ounces **7d**
Unguentum albu; non caphoratu 4 ounces

At the bottom of the list there is a note which reads 'Ask my Apothecary whether there be any good sarsaparilla yet'.

In Harriot's time tobacco was sold by apothecaries. One of the petitions in opposition to those apothecaries wishing to secede from the London Grocers Company and set up their own Company referred to them as 'discontented Apothecaryes and Tobacco Sellers' a description that would have prejudiced them in the eyes of James I, who despised the tobacco smoking habit. Thomas Harriot had good reason to

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be interested in the smoking controversy for in Mayerne's preliminary remarks concerning Harriot's illness he described him as being the man – *Primus ex Virginia invexit in Angliam usum fumi tabacii* – who first introduced the use of tobacco smoke from Virginia into England.

Tobacco was brought from the New World by the Spanish in the mid-sixteenth century. They named it *tabaco* although that word refers to the manner of smoking and not to the *nicotiana* leaf itself. It was discussed by the Spanish physician Nicholas Monardes (1493-1588) in the second part of his book *Dos Libros* in 1571. Monardes was widely read in Europe and his work appeared in an English translation by John Frampton in 1677 with the title *Joyfull newes out of the newe founde worlde* and Harriot refers to this book in his *Brief Report.*[2] Reporting on botany in the area of Roanoke he described a herb grown apart by the natives called *uppowoc* observing it to be the plant the Spanish called tobacco. He described how the local inhabitants sucked the fume of the dried and powdered leaves through pipes made of clay into their stomach and head. He began smoking tobacco in Virginia and on his return to England and referred to 'many rare and wonderful experiments of the virtues thereof'. He believed tobacco smoke purged superfluous phlegm and other gross humours and opened pores and passages of the body, thereby preserving it from obstructions. Doubtless until his illness his enjoyment of tobacco was enhanced by his belief in its virtues.

AQVA CINAMOMI
CLARETA D. MEYERNII
PER INFVSIONEM.

℞ Cinamoini interioris contuſi
vncias quatuor.
Spiritus vini rectificatiſſimi li-
bras duas.
Fiat infuſio per quatriduum vaſe
amplo, vitreo, ſubere & veſica ap-
primè clauſo, vas quotidie bis ter-
ue agitando. Seorſim vero diſ-
ſoluatur libra dimidia Sacchari
candi Chryſtallini in libris dua-
bus Aquæ Roſaruin. Miſceantur iſti duo liquores colati, & in-
datur nodulus continens
Ambræ griſeæ ſcrupulum di-
midium.
Moſchi Orientalis grana qua-
tuor.
ſeructur ad vſum.

From the Pharmacopoeia Londinensis May 1618

Heading the list of medicaments required by Harriot was Aqua Sinamoni (phonetic spelling for Cinamomi). There were three cinnamon waters in the first edition of the *Pharmacopoeia Londinensis* of 1618.[3] All were under the heading *Aquae Compositae*: *Aqua Cinamomi; Aqua Cinamomi Mathioli;* and *Aqua Cinamomi Clareta D. Meyernii per Infusionem*. The first was prepared by macerating and distilling cinnamon in Spanish wine, the second, devised by Pietro Andreas Mattioli (1500-1577), was made from bruised cinnamon, rose water and Spanish wine. The third was formulated by Theodore Turquet de Mayerne and was composed of bruised cinnamon, rectified spirit, sugar, rose water, ambergris and musk. It is most likely that Harriot was wanting the version devised by his physician, the formula of which accounts for the high charge of five shillings and two pence.

Ambergris, the waxy secretion of the sperm whale, was very rare and on the London drug market in the early seventeenth century it cost £3 an ounce, a sum that would have purchased nine pounds of opium. Musk from the sac of the musk deer was also expensive: the cost of an ounce would have purchased about four pounds of opium. Ambergris and musk were highly regarded cordials i.e. drugs for the heart. Before William Harvey's *De Motu Cordis* of 1628, revealing the role of the heart in the circulation of the blood, physicians followed the Galenic physiology and believed that 'vital spirits' were created in the heart before being circulated in the arteries. Ambergris and musk were among the restorative and cordial drugs that comforted the heart and raised the spirits of the patient.

Mayerne in his original treatment of Harriot's facial ulcer ordered two liquid preparations for cleansing the lesion. One was *Aquae Spermatis Ranarum* which was listed under *Aquae Simplicio* in the London Pharmacopoeia. Frog spawn was regarded as a cooling, anodyne remedy for burns, inflammations, fluxes and some skin diseases. Mayerne's therapy required the frog spawn water to be used together with a preparation of alum which featured next in the list of items to be supplied by the apothecary.

Aqua Phlegmatis Alluminis was a preparation of *Alum Ustum* or burnt alum. William Lewis writing in the mid-eighteenth century observed that burnt alum was employed for drying foul ulcers 'which it does with great mildness'.[4] The topical solutions prescribed by Mayerne would have been applied by taking a *pulvillus*, a small bag filled with chaff (husks

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of grain), soaking it in the lotion and applying to the ulcer. It is not known why Harriot was wanting taffeta but it may have been to prepare *pulvilli*. In the seventeenth century the term taffeta was applied to a light plainly woven fabric of either silk and linen or silk and wool.

West Indian green ginger, the next item on the list, was regarded as a warm, aromatic root to be used as a spice in cases of flatulent colic and other illnesses of the stomach. In a letter to Mayerne in 1615 Harriot complained of 'flatulences [that] rise from the stomach' and it is possible that he wanted ginger for relief from indigestion. There is, however, another possibility. In addition to the crude ginger root, apothecaries at that time sold it preserved in syrup and in candied form. The latter occur in the London Pharmacopoeia under the heading *Condita* and subheading *Condiuntur saccharo diligenter clarificato secundum artem* 'confections prepared according to the art by candying with thoroughly clarified sugar'. The cost of four ounces of ginger recorded on the shopping list is very much in excess of the cost per pound of the crude root quoted on the London drug market and it is therefore possible that Harriot was supplied with the candied form. Mayerne had prescribed purgatives for Harriot and it is possible that he was seeking a sweetmeat to cover the nauseous taste of the medicine, this being one of the other recommended uses for ginger.

The order for oak galls indicates that Harriot was preparing or supervising the preparation of his writing ink. The method was to boil the galls in water for about half an hour then add a soluble iron salt and some gum to the strained decoction. The salt used was iron sulphate, probably known to Harriot as *Sal Martis* or possibly *Copperas*. Harriot was no stranger to chemicals and chemical practice. He is known to have visited the Tower of London where his friend Sir Walter Ralegh was imprisoned along with Harriot's patron the Earl of Northumberland, the so-called 'Wizard Earl' because of his interest in astronomy, alchemy, mathematics and magic. Ralegh during his long sojourn in prison had been permitted to convert a small building into a still room where he made chemical experiments and one can imagine the results being discussed by the three men.

The final items on the list are ointments. Basilicon ointment, also known as Royal ointment was regarded in Harriot's time as a preparation possessing sovereign virtues. There were two formulae in the London Pharmacopoeia: *Unguentum Basilicon Majus* and *Minus,* both attributed to Mesue, the 13th century author of a number of Latin medical texts, although the formula may be much older. The principal components were beeswax, resin, *picis* (tar) and turpentine. The *majus* had added myrrh and olibanum. The second ointment *Unguentum alba* or White ointment was attributed to the Arab physician Al-Razi (Rhazes) and consisted of oil of roses, *cerussa* (lead carbonate), and beeswax. Camphor could be added but Harriot asked for white ointment without camphor. (*non caphoratu* on the shopping list should have been written *non camphorartu*).

Added to the list of medicaments to be obtained from the apothecary was a note for the servant to ask if there be any good sarsaparilla. This drug, a species of *Smilax*, was brought to Europe from Spanish America in the mid-sixteenth century and studied by Monardes along with coca, mechoacan and sassafras. Physicians in the latter part of the century compared it to China root, a species of *Smilax* imported from the Far East, in the treatment of the *Lues venerea* or syphilis. In his *Brief Report* Harriot refers to a Virginian root with the local name *Tsinaw* which he observed to be similar to China root. At the time Harriot was seeking a cure for his illness, sarsaparilla was being compared favourably with guaicum, another drug from the New World, then widely used in the treatment of syphilis. It was also related in its effects to sassafras which Harriot himself described as 'of most rare vertues in physicke for the cure of many diseases'. Harriot, like all learned men of his time, would have had some knowledge of contemporary medicine and would have attributed his illness to intemperance and putrefaction of the body humours, in particular black bile, the humour most closely associated with cancerous ulceration. We may assume he hoped that a decoction of good sarsaparilla possessing 'rare virtues' would temper, sweeten and purify the body humours restoring them to their healthy state.

It was not to be. Sarsaparilla would have had no effect and the topical applications prescribed for him would, in the words of Shakespeare in *Hamlet*, 'but skin and film the ulcerous place, whilst rank corruption, mining all within, Infects unseen ...' This was to be Harriot's fate, the ulcer becoming ever more painful, and turning into the malignant, flesh- and bone-eroding foulness that was described in sickening detail by the physician Alexander Read, who saw the patient early in 1621. On July 2 of that year Thomas Harriot, doubtless greatly weakened by malnutrition, died at the house of a friend in Threadneedle Street in the City of London.

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Apothecaries and Hospital Assistants in Colonial India

Professor Harkishan Singh

In the nineteenth century, in the official medical ladder next to the Indian Medical Service came the assistant surgeons, followed by the apothecary genus, with the hospital assistants being placed the last. There had also been in existence a cadre of sub-assistant surgeons. The apothecaries and hospital assistants had medico-pharmaceutical functions. For both there were military and civil branches.

Apothecaries

The title apothecary usually implies one who prepares and sells drugs or compounds for medicinal purposes. The term apothecary was borrowed from Britain, where it was used for medico-pharmaceutical practitioners.[1] The practice of medicine distinguished the apothecary from the chemist and druggist. In India, the institution of apothecaries also came to assume the corresponding meaning.

In Britain, the Apothecaries Act was passed in 1815 for the better regulation of the practice of apothecaries. The Act laid down the standards and controls for practice by apothecaries. They had a place in the British army.[2] It has been stated that, in an 1825 amendment to the Apothecaries Act 1815, a provision was made for apothecaries in the army (and the East India Company) to practise as apothecaries without statutory examination by the Society of Apothecaries.[3]

The place of the apothecaries in India is described on the basis of information from source materials which have become available on careful search. An early record showed that in 1847 five candidates had been admitted for the grade of native apothecary at the Madras Medical School, and three of them passed in 1852.[4] The last graduation took place in 1867. In 1873, the natives were now debarred from admission to the grade of apothecary.

In the early 1850s the apothecaries organised themselves into a society which was revived in 1864 as the Madras Apothecaries' Society.[5] In this Society, from the names listed of attendees at the business meeting, it appears that it was not a fraternity of the natives. It is not clear where these apothecaries had their tuition. The Society was to afford opportunities to the apothecaries of the service for professional improvement and general scientific study.

The military apothecary class was to do duty with European troops, hospitals, and depots.[6] There appeared descriptions of the procedures for training of apothecaries, particularly for the army hospitals.[7,8] A European or Eurasian boy between the age of fourteen and eighteen could enter the hospital of a British regiment to work as a hospital apprentice for two years. At the end of the period, if he was successful in an examination in the elements of anatomy, medicine, and surgery, and more particularly in the preparation and doses of medicines, he was sent to the Medical College in Calcutta for three years. On completion of this term, he became assistant apothecary, and gradually moved up to become a first class apothecary, by passing the required examinations in between. In the hospital of every British cavalry or infantry regiment there was one apothecary, one assistant apothecary, and two or more hospital apprentices. An apothecary was in charge of medicines and instruments. It was stated that 'He either makes up the medicines with his own hands, or superintends the native compounder when preparing them'.[8] In another paper it stated that the apothecaries were required to do dispensing themselves; any passing on of such work to a ward-servant was not authorised.[9] Among the apothecaries there was a 'pernicious habit' of allowing an old ward-servant to do much of the dispensing, the latter frequently styled himself as a 'compounder'.

The army apothecaries had grievances and considered apothecary a misnomer and a misapplied term. Ultimately in 1894 there was change of designation of army apothecaries to assistant surgeons.[10]

The civil apothecary class existed only in the Madras Presidency. It was opened around 1875 to take the place of military apothecaries at civil stations. Entry to the apothecary class was open to matriculates. The course consisted of two years at a civil dispensary and three years at the Madras Medical College, with periodical examinations.[12,13] The training given to the class was equal to that undergone by students qualifying for the Licence in Medicine and Surgery. The difference was that the education and training of the civil apothecaries was at Government expense, but the L.M.S. students supported themselves.[14] From 1883, the service was

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recruited from students who had attained the L.M.S. qualification.[11] By around 1895 the latter constituted one-third of the civil apothecary service. Most of the hospitals and large dispensaries in the interior of the districts were placed under the civil apothecaries. Though the education they received was comparable to the L.M.S. assistant surgeons, the designation remained inferior, and their salaries were very poor. The grievances of the civil apothecaries were considered genuine; their education and training was in no way inferior to the military apothecaries (now the military assistant surgeon class) and a change in designation accompanied by the appropriate salaries was favoured.[15,16] At long last in 1904, the civil apothecaries who had L.M.S. qualifications were transferred into civil assistant surgeons.[17]

Hospital Assistants

Before the start of the Medical School at Madras, later becoming the Madras Medical College,[4] dressers were trained at the General Hospital, Madras for service in the East India Company's regiments and civil stations.[18] Later, instruction continued at the School/College. The dressers designation was abolished subsequently, giving way to the grade of hospital assistants.[19,20] The students for this grade were required to pass an examination in English and arithmetic and spend a year doing compounding at the Presidency hospitals. This was followed by a course of two years at the Madras Medical College, where they received instruction in compounding, anatomy and physiology, materia medica, and elements of medicine and surgery. The course content went through revisions and modifications. Hygiene and midwifery were added. A reference to this Madras system is made, where previous work of two years in a military or civil hospital is mentioned, for two years of education at the Medical College in Calcutta.[21]

There were military and civil classes of hospital assistants.[22] They were invariably natives. The military native assistants served only in the native military hospitals with native troops. The civil assistants had their duties in the civil hospitals and dispensaries.

It has been stated that for the native army, hospital assistants performed the pharmaceutical duties.[9] Unlike the assistant surgeon, formerly apothecary, for the British troops, he was not obliged to dispense all the medicines himself, but was assisted by a compounder.

At the first decade of the nineteenth century, there were about one dozen large medical schools in India for the hospital assistant class, but the military hospital assistants underwent a course of education only at the schools at Poona, Ahmedabad, Royapuram, Vizagapatam, Tanjore, Lahore, and Agra.[22] The earlier curriculum of three years had been raised to four years. But whereas for the three schools in Madras and two in Bombay Presidencies, listed above, where English was the medium of instruction, vernacular language was used at most of the schools. In Madras, matriculated students were admitted, and at other schools there was an entrance examination for admission. The social status of civil hospital assistants was humble and their salaries were low. They remained an agitated lot and continued with representations for redress of their grievances. To project their class and interests they even published a periodical the *All India Hospital Assistants Journal*.[23] Around 1910 they were successful in getting for themselves the rank of Sub-Assistant Surgeon and much improved pay scales.[17,23] It was a much welcomed change for the hospital assistant class, which existed for over half a century.

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The Indian National Science Academy supports my research on the history of pharmaceutical developments in India, for which I am thankful.

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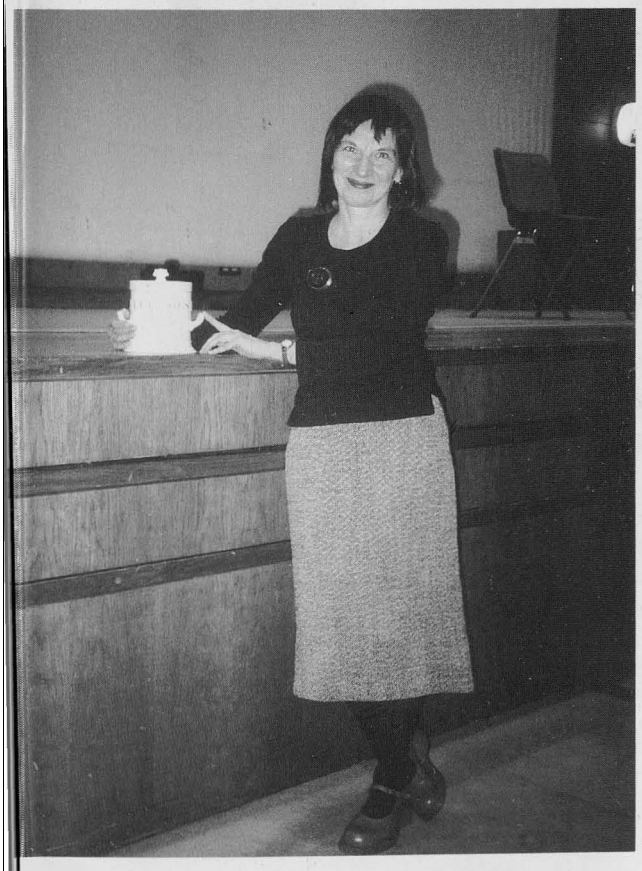
Caroline Reed, Museum Curator at the Royal Pharmaceutical Society, receiving a replica leech jar from Dr Peter Worling on leaving to join the De Morgan Centre



Caroline Reed with the replica jar

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Diary

Wednesday 5 June 2002
Visit to The Old Operating Theatre, Museum and Herb Garrett, 9a St Thomas' Street, SE1.

Wednesday 16 October 2002
Joint meeting of the BSHP and the Hull Pharmacists Association. 'Those Magnificient Men and Their Medicine Machines: The Glorious History of Pharmaceutical Invention'. Dr Stuart Anderson, vice-president BSHP. Start at 8pm. At the Beverley Arms, Beverley, East Yorkshire.

Wednesday 13 November 2002
A Visit to the Society of Apothecaries, Blackfriars.

Dr Peter Worling handing over the BSHP President's insignia to Dr Stuart Anderson at the evening lecture on 5 May 2002.

International Society for the History of Pharmacy

The next meeting of the International Society for the History of Pharmacy will be the **36th International Congress** in Bucarest, Romania in September 24–27, 2003. Details can be obtained by filling in the form on the copy of News Letter number 3 sent to all members or from the International Society website at **www.histpharm.org**

Review

History of Pharmacy in India and Related Aspects, vol. 3: Pharmacy Practice
Prof. H. Singh, 2002. Delhi: Vallabh Prakashan, SU-221 Pitampura, Delhi 110088, India, pp. 226; (ISBN 81-85731-31-4), price US$45 plus post $8.

In volume 3 of his series Professor Harkishan Singh has explored the history of Pharmacy Practice in India. An introductory section outlines the development of pharmacy up to stage of its regulation by the introduction of the Drugs Act 1940 and the Drugs Rules of 1945. He then goes on to deal with the introduction of the Western medical system and the development of pharmacy in India during the colonial period. Of particular interest to those who have spent time in India is the chapter dealing with the major pharmacies up to the time of Independence (*see* Pharm Historian 2001; 31(4): 58). A chapter on overseas trade (ibid. 31(1):49) is followed by one on the trade organisations and shows the influence these have had on the growth of the profession. Later chapters deal with hospital and community pharmacy, bringing the story up to the present time.
Professor Singh has produced an excellent record of the history of pharmacy in India. This will serve as the standard text and reference on the subject for many years to come. Its publication should stimulate a greater interest in the history of pharmacy in India and the comprehensive references quoted will be of great value to other researchers who wish to work in this field.

Peter Worling

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Sidelights on the Supply of Drugs to Pre-Revolutionary Virginia

Dr C.H. Spiers

Prepared by Dr J. Burnby

Griffenhagen has discussed at length the supply of drugs to the American colonies at the outbreak and during the War of Independence, the problems of distribution and the furnishing of medicine chests needed by the surgeons; he dealt however with the more northern colonies.[1] Most drugs and medical supplies had to be imported, and even during the war were brought in by one means or another. Blanton has given attention to the activities of the physicians, apothecaries and druggists in eighteenth century Virginia, but little has been written about the way drugs were obtained from England.[2]

The chief source of wealth in eighteenth century Virginia was tobacco, the export of which had commenced in 1614; as time went on most of the prominent citizens were planters on a fairly large scale, employing slave labour for the purpose. Much of the tobacco was sold on a consignment basis to an English merchanting house in London, Bristol or Liverpool. In later years Scottish merchants in Glasgow entered the trade by making direct purchases.

Against the credits thus established, the English merchants bought for their clients on a commission basis various commodities for the planters' use or for resale, which they dispatched to Virginia. Private bills of exchange drawn upon the English merchants were an essential instrument of trade.

The planters would, at intervals of say twice a year, send their agents long lists of requirements, relying on their agents to buy exactly what they needed, though the Virginians often complained about quality or the prices. Despite the delays and uncertainties entailed in this procedure, the planters tended to cut out the local merchants and shopkeepers, many of whom in any case also ordered directly from wholesalers or consignment houses. Interesting details are available about the drug trade of some of the consignment houses, as for example those of Robert Cary & Son, John Norton & Sons and the Athawes, Edward and Samuel.[3,4]

There were three branches of the Cary clan. First, there was a Devon branch originating with James of Bideford and his son James (1622-94) who went to London to become a Virginia merchant, while one of *his* sons, Oswald, settled in the colony as a planter. A grandson Robert (1685-1751) handled Oswald's tobacco. The whole inter-relationship continued with Robert's son (1730-1777), also Robert, working in the London business at 91, Watling Street with various partners such as John Moorey and Wakelin Welch.

Then there were two Bristol Cary families. One was that of John Cary (1647-1730), merchant and writer on trade and economics, whose sons went out to Virginia and became merchants. A second family stems from another John Cary (1583-1661), a draper, whose younger son Miles (1613-1651), also settled in Virginia, while his eldest son, Thomas (1645-1701) established himself in London as a merchant, although one of his sons, yet another John (1645-1701), spent eight years in Virginia where he married and where his eldest son was born in 1667. John returned to England, to become John Cary & Co. of Tower Hill, London, and a leading Virginian and West Indian merchant. His eldest son Thomas became a partner in 1694. Consequently there were many Carys in both London and Virginia, which became very useful for business purposes.

As a bachelor, Washington's tobacco interests were small and he used the firms of Bacon, of Robert Cary & Co., of Richard Washington, the Bristol firm of Thomas Knox, and James Gildart of Liverpool. After his marriage to Martha Custis in January 1759, he became one of the larger planters and became concerned in selling the tobacco of his third of the Custis estate and the two-thirds of the Custis children. Thence forward he shipped his own tobacco mainly through Robert Cary & Co. Twice a year he sent his London agents a long list of required goods for the use of his family and himself, and on his plantations.

After his marriage he consigned some of his own and much of the Custis tobacco to Capel and Osgood Hanbury, but continued with Richard Washington and Thomas Knox.[5] The Hanbury firm of John and Capel continued as such until John died in 1758 and was succeeded by his son, whereupon it became Capel and Osgood Hanbury.

The firm of John Norton & Sons evolved from that of George Hatley. He seems originally to have joined John and Thomas Cary & Co. in the 1690s in several enterprises, and after John Cary's death in 1701 continued with Thomas. By the 1730s he was a director of the London Assurance Company, and formed with his step-son, Thomas Flowerdewe, a partnership at Tower Hill. Flowerdewe may have acted in Virginia up to about 1738 when Hatley's nephew, John Norton, went to Yorktown as a junior partner. On Hatley's death in 1742 the firm became Flowerdewe and Norton, the former attending to affairs in London and the latter in Yorktown. There, Norton engaged in several business 'adventures' with others including Charles Minn Thruston, 'The Fighting Parson' and took part in local activities.

Norton married the daughter of a well-to-do Virginian, was twice elected to the House of Burgesses, became a Justice of the Peace and remained a Virginian until he died. On Flowerdewe's death in 1764, Norton returned to England with his family. He settled at 8 Gould Square, Crutched Friars, having left his affairs in Virginia in the charge of

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Edward Cary; he died in London in 1777.

John Norton's eldest son, John Hatley Norton, had been born in Yorktown in 1745 but was sent in 1757 to England to be educated. He returned to Virginia in April 1767 as local agent, but became a partner only a year later. Norton's third son, George Flowerdewe Norton, likewise born in Yorktown (1751) also came to England for his education in 1761,and became a partner in 1774.

Washington did not apparently ship through Norton's, though certainly he knew John Hatley Norton, as his diary entry for 9 January 1760 relates 'some things for me that lay in Mr Norton's Warehouse in York Town'. Furthermore his entries for 20 July and 26 July 1771 record that John Hatley Norton had dined at Mount Vernon and stayed overnight.[6] The Norton papers in contrast to those of Washington's give both sides of the correspondence and are concerned with a wide range of Virginian personalities. They shed much light on Virginian affairs during these pre-Revolutionary years.

The firm of Edward and Samuel Athawes was already in existence at Martin's Lane, Canon Street in 1740, and acting as consignee for many planters.

Changing relations with America

During the decade preceding the war, relations between England and the American colonies became increasingly embittered. Trade became more difficult and planters tended to run up large debts with their merchants. In 1763 Grenville passed a measure which enforced the old Navigation Acts more rigorously and imposed new duties. By February 1765 in order to pay for the troops stationed in America he passed the Stamp Act which was to come into force in November. In Washington' s county of Westmoreland in 1766, Lee formed an Association for the Non-importation of British Manufactures until the Act was repealed. It was repealed in the following March and was replaced by duties on tea, glass, paper, paints and other imported items. As a consequence in 1769 a new association was formed to avoid taxation by Parliament for raising revenue in America, an action approved by Norton in London.

Robert Carter Nicholas, State Treasurer and a Norton client, wrote to Norton saying 'you may expect very few orders for goods for next year; for my own part I am resolved to import nothing that I can possibly do without'. On 20 June 1770, another association was formed between the House of Burgesses and the body of merchants of Virginia (including John Hatley Norton) agreeing to boycott spirits, food, oil, luxuries etc. after 1 September.[7] Washington's order to Cary of 20 August 1770 was conditional upon 'the Act of Parliament imposing a Duty upon Tea, Paper etc., for the purpose of raising a Revenue in America', being repealed before the goods were shipped.[8]

However, by 17 May 1771 William Nelson, President of the Council, could write to Norton 'The Spirit of Association hath grown very cold of late and I believe will shortly come to nothing'.[9] Washington in July 1771 also wrote to Cary's that it was at an end, except for tax against tea, paper, glass and painters' colours of foreign manufacture. Rather surprisingly, on 6 October 1773 he ordered window glass, oil colours and linseed oil from the same firm for repairs and alterations to his house.[10] Indeed, Treasurer Nicholas in June 1772 was in contact with Norton's for a supply of copper coinage from England, and in March 1773 was ordering paper for an issue of notes.[11] Possibly he had been influenced by the marriage of his daughter Sarah to John Hatley Norton.

In Massachusetts action was more drastic, the 'Boston Massacre' occurring on 5 March 1770, the very day that North repealed all the duties except for those on tea. In May 1773, in order to help the East India Company, North removed the duty paid on Indian tea in England on its way to America, but not the Townshead duty, so cheapening tea in America. John Norton in London was among those who advised against this policy. The 'Boston Tea Party' occurred at midnight on 16 December 1773, so in retaliation North in March of the following year passed a Bill closing Boston harbour to all commerce from 1 June. The Virginian Convention in Williamsburg in August followed with a more rigorous Non-Importation Association agreement which now included all British manufactured goods, and decided to stop tobacco exports.

During all these troubled times, Cary's and Norton's continued to trade,although the latter on arrival at the York river on 4 November had its tea thrown overboard. The first Continental Congress at Philadelphia on 5 September 1774 banned all British manufactures as from 1 December. War broke out with the battle of Lexington on 19 April 1775, though the last shipment of tobacco by Norton's seems to have been made in September.

A comparison of some of the drugs supplied to Nortons in 1770 and 1771, Athaws in 1766 and Carys in 1759 and 1767, and for the medicine chests is shown in Table 1.[12] The contents of the medicine chests are compared with the orders to suppliers in Table 2.[13]

About 1765, Timothy and Sylvanus Bevan at Plough Court began to develop an export trade which was continued by Timothy's son, Joseph Gurney Bevan who took over the firm in 1775.[14] It was from Bevans that Dr Morgan, founder of America's first school of medicine in Philadelphia, bought in 1765 an assortment of medicines which he took back to America. Joseph's letter books show the difficulties of a scrupulous Quaker in carrying out trade during the war.

As to the botanicals, some were native to Spanish America and the West Indies, for example the balsams of Tolu, Peru and Copaiba, and may have been obtainable directly, whilst others were available in

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Table 1: Examples of Drugs and Medicines in various Orders and in Medicine Chests

Drug	Norton Orders		Athawe Order	Cary Orders		Medicine Chests for	
	1770	1771	1766	1759	1767	Pennsylvania 1776	Northern Dept 1778
Botanicals							
Allspice	1 lb	–	–	–	–	–	–
Asafoetida	–	2 oz	–	–	–	–	–
Balsam Capivi	4 oz	–	–	4 oz	8 oz	1¼ lb	2 lb
Camphor	–	3 oz	–	–	–	–	–
Caraway seeds	1 lb	–	–	–	–	–	–
Cardamom seeds	1 lb	4 oz	–	–	–	–	–
Cinnamon	1 lb	–	–	–	–	–	–
Cloves	1 lb	1 lb	–	–	–	–	–
Gentian root	2 lb	8 oz	4 oz	–	–	1 lb	2½ lb
Ginger	6 lb	3 lb	–	–	–	–	–
Ipecacuanha pdr	–	–	–	8 oz	–	8 oz	12 oz
Jalap pdr	1 lb	–	–	8 oz	–	–	–
Jesuit's bark	i lb	–	–	–	–	–	8 lb
Jesuit's bark pdr	–	1 lb	–	–	2 lb	4 lb	6 lb
Juniper berries	–	1 oz	–	–	–	–	–
Mace	1 lb	–	–	–	–	–	–
Myrrh	–	–	2 oz	–	–	4 oz	2 oz
Nutmegs	1 lb	–	–	–	–	–	–
Oil Linseed	–	–	–	2 lb	–	–	–
Oil, mace	2 oz	–	–	–	–	–	–
Oil olive	–	–	1 lb	–	–	2½ lb	–
Orange peel	2 lb	–	–	–	–	–	3 lb
Orange peel, bitter	–	1 lb	–	–	–	–	–
Pearl barley	–	2 lb	–	4 lb	–	–	–
Pulvis Basilic.	–	–	–	4 oz	–	–	–
Rhubarb, Turkey	–	4 oz	1 oz	4 oz	3 oz	1¼ lb	6 lb
Sago	–	4 lb	–	4 lb	–	–	–
Turmeric	–	4 oz	–	–	4 oz	–	–
Chemicals							
Alum	–	2 lb	–	4 lb	–	1 lb	–
Antimony	–	–	–	–	25 lb	–	–
Calomel	4 oz	–	–	2 oz	–	8 oz	–
Cream of Tartar	2 lb	1 lb	3 oz	–	–	4 lb	2 lb
Glauber's Salt	4 lb	6 lb	–	–	–	10 lb	–
Magnesia Alba	1 lb	–	2 oz	–	–	–	–
Red Precipitate	–	–	1 oz	–	–	4 oz	2 oz
Sal Ammoniac	8 oz	–	–	5 oz	–	–	8 oz
Sal Vitriol	4 oz	–	½ oz	–	–	4 oz	2 oz
Salt Wormwood	–	–	½ oz	–	–	8 oz	–
Saltpetre	14 lb	–	4 oz	–	–	4 lb	4 lb
Sulphur Flowers	–	–	–	–	10 lb	4 lb	2 lb
Sweet Elixir of Vitriol	–	1 oz	–	–	–	3 lb	2 lb
Tartar Emetic	–	–	1 0z	–	–	6 oz	8 oz

Note: This table[12] is a sample of a larger listing in Dr Spiers' manuscript, which also covered drugs of animal origin, ointments, plasters, spirits, tinctures, waters, miscellaneous preparations, surgical instruments and other supplies on dates later than those in the table.

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Virginia itself, as had been noted by Thomas Harriot as early as 1585,who went on to say that its use was far superior to Guaiacum.[15] Sassafras wood and China root were brought to England by Samuel Mace in 1602, and seventy years later Thomas Glover reported that there was Sassafras, Rad. Serpentaria Nigra, Turbith and Mechoacan, as well as a plant called by the English 'The Fever and Ague root'.[16] He also said that Wormwood, Rue, Coriander and other plants had been introduced. He remarked that Serpentary root was 'so much used in the last pestilence that the price of it advanced from ten shillings to three pounds sterling a pound. All the Indians carry a Powder about them to cure the bites of Snakes, and in almost every town this powder hath a different Composition, and every Composition is certainly effectual to correcting of the malignity of the Venom'.[17]

Table 2: Contents of Medicines Chests

Class	Items in the Medicine Chests		Total Items
	From Griffenhagen	In Main Norton, Cary and Athawes Orders	InMain Norton, Cary and Athawes Orders
Botanicals	27	11	28
Animal origin	5	3	6
Ointments	5	4	5
Plasters	5	3	5
Spirits	4	3	5
Tinctures	3	2	7
Waters	0	0	5
Miscellaneous	8	4	19

Jefferson listed 21 medicinal plants native to Virginia.[18] Senna was not indigenous and Dr Benjamin Worsley was granted a monopoly for its cultivation in the colony for fourteen years in 1688.[19]

As regards Senega, there was much confusion. Johnson's enlarged edition of Gerarde described it as 'the much admired Snakeweed of Virginia', which 'was a much used antidote against the bite of the Rattle-snake, or rather Adder or Viper'. Many commended its use in plague, smallpox and measles.[20] Parkinson said it 'hath been found a certaine and present cure for the biting of the madde dog'.[21] The root seems to have acquired the name Senega from its use by the Seneka Indians as an antidote for rattle-snake bites. According to Salmon (1693) there were four kinds of Virginian Snake Root (*Serpentaria virginiae*) of which 'the smaller one only is that which is sold in our shops'.[22]

In Virginia its virtues for all kinds of ills were lauded in *Every Man his own Doctor or the Poor Planter's Physician*; the second edition appearing in 1734 was attributed to Dr John Tennent, an English doctor resident there. His efforts gained him an award of £100 from the Virginian House of Burgesses in December 1739.[23] In 1764 some 'snake root' was sent to Norton's in London, and on 13 January 1767 a ship left with eight casks of it.[24] Bevan wrote to a correspondent in 1776, 'Thou will observe the snake root to be very dear, the cause is the stoppage of the America trade. The insurance is raised on account of the American privateers.'[25]

Corbyn may have been the first wholesaler to import the root directly. Stephenson and Churchill (1831) describe Virginian Birthwort (*Aristolochia serpentaria*) as being in this country 'highly extolled by Cullen, Monroe and other eminent physicians... By us it is simply employed as an antispasmodic and anodyne.'[26] *Polygala senega* was still being imported from Canada by Stafford Allen & Co. in 1932.

Ginseng was another Virginian plant whose root was regarded as having medicinal virtues. A related plant was much esteemed in China, and a Jesuit, Father Jartoux writing from Peking to his Superior in October 1711, stated it was a remedy for all weaknesses caused by excessive fatigue of the body or mind, as well as those of the lungs. His letter was published and illustrated.[27] Dr William Byrd II (1674-1741) searched and found it in Virginia. Calling it 'The King of Plants' he promoted its use, though Quincy (1733) wrote that 'Modern Practice takes little notice of it.'[28] Despite this, a box of it was sent to London on the *Sally* on 13 January 1767, and later that year eighteen hogsheads more, followed by some more in 1770.[29]

Castor oil was included in the medicine chests supplied to America. The oil was sent to Wilson Miles Cary, once a naval officer but now a 'poor, sickly person' who gratefully acknowledged it on 4 July 1771.[30] As to rhubarb, there were several sorts and confusion as to its place of origin. There was the 'true' or 'Chinese' rhubarb brought overland via Moscow and St Petersburg, and the Turkey rhubarb from Tartary and regions around the Black Sea which probably came on the market via Aleppo. In Tartary there were two kinds of rhubarb plant, *Rheum palmatum* and *Rheum undulatum*. The seeds of the former were sent to Scotland in 1762 from Russia by Dr Mounsey and were grown in Edinburgh by Dr Hope.[31] The Virginian botanist John Clayton was quick to order the *palmatum* seeds on 18 March 1771.[32]

Amongst the farriery medicines ordered by George Washington on 20 September 1759 were Fenugreek seeds which according to the *New Dispensatory* were mainly used for poultices and fomentations, as well as emollient glysters. Evidently he found these useful, for his diary records him planting some rows of them

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on 20 March 1765.

When William Nelson ordered musk for his wife on 19 July 1770, he wrote:

> She hath for some time been much affected by a Weakness of Nerves, and her greatest relief is from a liberal Use of Musk: as that is a very expensive Medicine in the Shops here, I beg you to send me by the first Ship 2 ounces of it: to be bought of Apothecarie's Hall, and carefully pack't, as it is very apt to evaporate and lose Part of its Virtue.[33]

Among the imported chemicals was Magnesia Alba, long used and esteemed as a mild, tasteless purgative, but its preparation was not generally known until Friedrich Hoffmann (1660-1742) published on it.[34] It was not in the *London Pharmacopoeia* of 1746 or the *London Dispensatory* of 1753. No doubt Black's researches on its preparation and nature in 1755 publicised its use.[35] It was included by Berkenhout in 1766 and in the *London Pharmacopoeia* of 1787. Washington seems to have been a great believer in the emetic properties of antimony, and of sulphur which 'loosens the belly'.

The more orthodox medicines of the day were to be found in the medicine chests (see Table 2)[13] but there was also a range of 'patent' medicines. Their variety was shown by the advertisements of John McCarty, an apothecary of Petersburg, in the *Virginia Gazette* of 30 December 1773:

> We have lately imported from London in the *Royal Exchange*, Captain Woodford, and the *Hope*, Captain Holmes, a fresh Assortment of Drugs and Medicines which will be sold at the same low Prices as usual at our Shop in Petersburg. Likewise Keyer's Pills, Norris's Antimonial Drops, Dr Radcliffe's Purging Elixir, Squire's and Daffy's Elixirs, Walker's Jesuit Drops, Bateman's ditto, James's Fever Powders, Turlington's Balsam of Life, British Rock Oil, Anderson's and Lockyer's Pills, Greenough's Tincture for the Gums and Teeth, Freeman's and Godfrey's Cordials, Essence of Water Dock, Tincture of Golden Rod, Beaume de Vie, Hoppers' Pills, Pike's Ointment for the Itch, Eau de Luce, Hungary, Lavender and Orange Flower Waters', and so on. Also listed were Smelling Bottles, Nourishers, Cephalick snuff, Hardham's ditto, No. 9 Teeth and Flesh Brushes, Ladies Sticking Plaister, Nipple Glasses, Breast Pipes, Isinglass, Hartshorn Shavings, Sago, Salep, Vermicelli, French and Pearl Barley, Antimony, Brimstone, Verdigrise, Rotten Stone, Spirit of Turpentine, Crucibles, Black Lead, Pots etc. Also Anchovies, Capers, pickled Walnuts, East India Mangoes, etc.[36]

Washington's order of 1 May 1759 for 'Greenhow's Tincture' seems to foreshadow his well-known dental troubles. Henry Purefoy on 1 March 1751 ordered 'the Tincture for preserving the Teeth and two Tooth Brushes from Mr Greenhough's near St Sepulchre's Church on Snowhill' which had been patented in 1744.[37] While serving with Braddock's expedition against Fort Duquesne during 1753, Washington on 14 June 'was seized with violent Fevers and Paines for nine days' when "immediate ease" was given by Dr James' Powder, administered by Braddock's orders.[38]

Norris's Antimonial Drops, patented in December 1768 as a remedy against fevers and inflammatory conditions, were by 1771 'much esteemed' in Virginia and were being ordered from Norton's. Apparently at that time, Mrs Norton in London had joined with Dr Norris to exploit his nostrums, and approaches were made to Mrs Goosely of York Town, the wife of the 'General Agent and Manager of the Fleet', (who was said to be the 'Manager of all domestic Emergencies in the Town of York and general Dispenser of Gossip') suggesting that she should join the partnership. She however was 'no little mortified at Mr Norton's proposal ... there being very material difference in a Quack and one who practises as Physician in general to so popular a Town as York'.[39]

Nevertheless three dozen bottles of Norris's Drops were ordered and received in 1772 by Robert Carter Nicholas and soon distributed by his wife.[40] The remedy was also imported by McCarty. Ward's White Drops, an ammoniated solution of mercury, one of Joshua Ward's (1685-1761) remedies was another favourite. The nature of 'Poor Knight of Windsor's Red Fit Drops', Thompson's Styptic, and Bath and Tunbridge Elixir have not been ascertained.

Of cerecloths Quincy writes that they are 'of a consistency between an Unguent and a Plaister' and four were described in the *London Pharmacopoeia* of 1746.[41] Pepys records that in 1667 he 'had a cerecloth laid to my foot', after he had sprained it near Epsom,[42] and Henry Purefoy noted in 1739 that the cerecloth applied to his knee was still sticking on.[43] Turner's Cerate was used for cutaneous ulcerations and excoriations.[44] Opodeldoc or soap liniment and Castile soap were also ordered

Though Hemet's 'Essence of Pearl for the Teeth' and 'Pearl Dentifrice' were patented only in January 1773, they were advertised as early as 1771.[45] William Reynolds must have become acquainted with them while he was in London working in John Norton's counting house and ordered them when he returned to Virginia.[46] His tooth hygiene seems to have set a fashion, for Mrs Catherine Rathell who kept a general store very soon afterwards ordered both of these dental products, also four dozen toothbrushes.[47] The first two were ordered from William Bayley, perfumer, in Cockspur Street.

Henry Purefoy wrote to his agent, Peter Moulson, asking him to 'get me a gallon or two of French brandy, it must be good because it is to infuse my Rhubarb and Hiera Picra therein for my gout'.[48]

Self-treatment was also shown by the books ordered. One of these was Dr Tissot's *Advice to People in General with regard to their Health* ordered in 1769 and 1771 from Norton's.[49] It was an English translation of a work by the Swiss, Samuel Auguste Andre Tissot *Avis au Peuple sur la Santé*, published in 1761 at Lausanne. It was evidently very popular in Britain for many English editions were printed. Wesley in his later editions of *Primitive Physic*

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incorporated many of Tissot's remedies.[50] Washington is known to have ordered in July 1771 *Tysotts Practice of Physik*, presumably the same work. Another commonly ordered book was Dr Coe's *A Treatise on Biliary Concretions or Stones in the Gall-bladder* of 1757.[51] Here again the local suppliers were by-passed as a good selection of medical works were advertised for sale by Dixon and Hunter.[52]

The pewter still for distilling roses and simple waters, ordered by Peter Lyons, planter and lawyer, in 1768 was to replace a 'Copper Alimbeck or Cole Still which leaked in many places and was so badly tinned that no use could be made of it for everything tasted of the copper'.[53] Salmon had recommended for this purpose that an alembic should not be tinned within.

Dr James Carter grew tobacco and had a drug-store called 'The Unicorn's Horn' in Williamsburg. He sold a large variety of goods and in May 1769 ordered a '100 gross of best Viol corks', and eighteen months later, 'A groce 8oz white glass Vials & 2 groce 10 oz Do'.[54] During the period 1609-1739 there were five or six attempts to produce glass in the American colonies. A furnace was erected in 1607 near Jamestowm which continued until 1623, and probably made bottles, but none can be reliably assigned to the seventeenth century. The English government discouraged the manufacture of glassware so that in the eighteenth century there appear to have been few, if any, glass houses working until Caspar Wister set up in Sale County, New Jersey in 1739. This factory operated continuously until the War of Independence, bottles being made as well as retorts and pestles and mortars. Henry William Stiegel started making glassware in 1765 but ceased in 1774; he made a large variety of domestic glassware, and according to an advertisement in the *New York Journal* of 1773 'Phials and other bottles for Chymists and Apothecaries'.[55]

Revolutionary War

After hostilities began in April 1775, it was some time before the full impact was felt in Virginia. As late as the September, a Norton ship left Yorktown with tobacco, but inevitably the trade gradually ceased. John Norton died in London in October 1777, and early in 1779 George Flowerdewe Norton left for the West Indies via Amsterdam and St Eustatia, reaching Barbados in August.[56] John Norton's widow Courtney and their second son Harry later that year left for Virginia via Barbados where her uncle John Tucker lived. There she died in August 1780, and Harry soon afterwards. The Norton affairs in London were now left in the hands of James Withers who had been with the firm some thirty years. Withers soon set up on his own in Copthall Court.

In Virginia, John Hatley Norton had become involved in state affairs. On lst July John Norton & Sons lent the state £5000 to buy gunpowder, and in September John Hatley became a captain in the Virginia Militia.[57] In 1776 he lent £2000 to the Committee of Safety to buy ammunition in the West Indies, the Dutch island of St Eustatia, and Antigua.[58] When in 1776 the Continental Congress wanted to establish a Virginian hospital for the sick and wounded, in their survey of private houses they found John Hatley's in Williamsburg 'airy and pleasant'.[59] By 1777 the Norton ships were equipped for war, and John Hatley Norton engaged, with some success, in importing goods and exporting tobacco via the West Indies.[60] By then he was in partnership with Samuel Beale, advertising in the *Virginia Gazette* that they had for sale 'at the Subscriber's Store in the City, a choice Assortment of Medicines just imported .. also a quantity of Copperas.'[61]

An idea of his trading methods can be obtained from an advertisement of 15 May 1779: 'Wanted on Charter for the West Indies, parts of fast sailing Virginia Pilot Boats.'[62] In October he advertised that he had for sale shoes, cutlery, clothing, textiles, West Indian rum etc.; as William Reynolds, paymaster for the State troops and a Justice of the Peace, wrote to George Flowerdewe Norton in London in the October of 1778 'Your brother has been very successfull this War'.[63] By 1779 he was able to buy much land.

Another importation of drugs was made in 1779 and on April 30th, James Clay writing from Williamsburg to George Flowerdewe in Amsterdam told of a shipment of medicines and other goods sent to St Eustatia, some of which he had been able to get to Williamsburg, but now seemed to have had difficulty in selling 'which are a *drug*, however I must serve them out in scruples, if not to be disposed of otherwise'. Nevertheless he sold 4 casks of Copperas (Salt of Iron or Sal Martis), 6 lbs of Calomel, 6 lbs of Bark, 3 lbs of Ipecacuanha, 2 lbs of Rhubarb, 10 lbs of Quicksilver and 3 lbs of Tartar Emetic.[64]

Griffenhagen has fully discussed many of the problems of supply and distribution of drugs during this war, but supplies did come in during that time by one means or another. Men such as John Thompson of Petersburg, Virginia,still advertised that they had 'Jalap, Rhubarb, Glauber and Epsom Salts, and Jesuit's Bark, and a Host of other supplies'[65] as they could come through any ports that were still in British occupation or else American ships slipped through the blockades. The problems were rather ones of distribution.

During March and April 1777 Craigie, who was responsible for the Northern Department, wrote to Potts the Surveyor General that Cantharides and Bark which were expected to arrive in Baltimore 'from some place in Virginia where they were first landed' had not arrived as they had been 'seized near Williamsburg for the Use of the Virginian State'.[66] Thomas Jefferson, the Governor of Virginia (1779-81) had to involve himself with the supply and distribution of drugs. Dr Mortimer, in charge of the Continental Hospital in Fredericksburg, had to write to him regarding the supply of some thirty drugs.[67]

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Independence

By 30 November 1782 the independence of what was to become the United States was recognised. John Hatley Norton purchased the interests of his brother and other members of the family in the parental estates, and of the firm which had many debtors. The latter pressed their claims but had much difficulty in collecting the money due to them. Even in 1773, it had had 398 outstanding accounts amounting to £63,856.[68]

A report of 5 February 1791 said that some 200 London merchants and others, apart from Norton's which had a non-loyalist partner, claimed debts of nearly £5 million, including fourteen years interest. Of this £2.3 million was owed by Virginia, £390,225 to Londoners.[69] Hanbury & Co. claimed £78,809 14s 4d. During 1788-91 Jefferson was approached by John Paradise of London for help in collecting debts owed by John Hatley Norton, who was still personally well-off,[70] but in 1792 he claimed great financial troubles and when he died in 1797 he was said to be virtually penniless.

George Flowerdewe Norton succeeded in reaching Virginia from Barbados by October 1782 and two years later petitioned the House of Delegates complaining that as a result of the difficulties of collecting what was owed to him, he was in the greatest extremity.[71] In April 1791 however he was helped by Hannah Fairfax Washington approaching her cousin-by-marriage, George, to obtain an appointment for collecting duty on 'Ardent Spirits and Stills'.[72] In the end he seems to have received the offer of a subordinate post in the 'Surveys of Inspection'.

One might perhaps agree with Isaac Harrell that considering the indebtedness of the planters in Virginia, 'Revolution' and 'Independence' simply provided a convenient release from an inextricable economic situation.[73]

Note. This article is an extended version of one published by Dr Claude H. Spiers in the same month that he died, in March 1977. (*Pharmaceutical Historian* 1977; 7(1): 2-3). It has been prepared from his extended notes by Dr J Burnby.

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Thomas Stephenson, DSc, PhC, FRSEdin, FCS: A Man of Parts

Dr Peter M. Worling

Thomas Stephenson was born on 28 November 1864 in Edinburgh. His parents were John Bertram Stephenson and Jane Noble, who was the sister of Alexander Noble, the manager of Duncan and Flockhart's branch at 139 Princes Street. The couple were married on 18 June 1861 and John was the second of six children, his elder sister Anna was born on the 29 April 1862, his brother, Alexander Noble in 1866, John Bertram in 1869, Harry in 1870 and Isabella Bertram in 1872. His grandfather was Dr Joseph Stephenson, FRCS.

His father, John Bertram Stephenson, was a pharmaceutical chemist who was well known in Edinburgh.[10] In 1862 he was employed at James Robertson and Co. chemists at 37 George Street, Edinburgh. His home was at 35 George Street and this was where Thomas was raised in his early years.[1] John Bertram Stephenson was Chairman of the British Pharmaceutical Conference when it was held in Aberdeen in September 1885. He acted as Chairman of the Board of Examiners for the North British Branch of the Pharmaceutical Society and was associated with James Robertson in the compilation of the first *British Pharmacopoeia*. He subsequently moved his home to 8 Belford Place sometime before 1875 and opened his own pharmacy at 71 George Street.[6]

Stephenson was educated at the Edinburgh Institution for Classical, Scientific and Commercial Education at 8 Queen Street, Edinburgh. This was established on 1 October 1832 by the Revd Robert Cunningham, previously headmaster of George Watson's College. It was for 'the large mass of boys for whom classical accomplishments were foreseen to be useless and had modern studies shared equally with the classics, fitting boys to take their place in the life around them'. This building is now part of the Royal College of Physicians. Thomas was then apprenticed to his father and he is recorded in the 1881 census at the age of 16 as a druggist's apprentice living with his parents at 8 Belford Place. During this time he studied chemistry under Dr Stephenson Macadam and attended lectures in botany and other subjects at Edinburgh University. He also attended lectures at Surgeon's Hall, Edinburgh where he was a medallist.[2] He qualified as a pharmacist in 1886. By this time his father had opened a business round the corner at 48 Frederick Street.

At this time the New Town of Edinburgh was very much the centre of medicine and pharmacy. H.C. Baildon, a leading light in the Pharmaceutical Society who had been an apprentice at John Bell & Co. in Oxford Street, London, had pharmacies at 73 and 148 Princes Street. Duncan and Flockhart had a branch at 139 Princes Street and John Pottage at 117. In Charlotte Square, at the end of George Street, there were twelve practitioners of medicine including Professor Grainger Stewart at 19 and Professor Annandale Thomas at 34. George Street had four pharmacies, including William Burley at 137, J. Robertson still in business at 35, and the office of the Pharmaceutical Society at 119a with John Mackay, Pharmaceutical Chemist, the Secretary of the North British branch of the Society and a staunch supporter of Jacob Bell at 119.[3]

Professor J.Y. Simpson was at 52 Queen Street along with the Edinburgh Institution, the Royal College of Physicians , the Central Board of Lunacy and the consulting rooms of one medical practitioner, two surgeons and two dental surgeons. J.B. Stephenson had competition from a druggist, Alexander Malcolm at 18 Frederick Street. Consequently we are safe to assume that Thomas was exposed to all the medical and pharmaceutical activities that was going on in his immediate area.

India

Sometime after he qualified Thomas Stephenson left for Bombay, India to take up a position as an assistant at Messrs Kemp and Company. This company was rated as among 'the best chemists of the East'. It had been established by David Skinner Kemp, a Scot, in 1864. This was a well established company with three branches. They had an extensive business in aerated water, and a wholesale business supplying medicines, surgical instruments, chemicals and photographic equipment. The company also shipped Indian drugs to the London and American markets.[34]

Stephenson was interested in writing and he compiled *The Prescribers Pharmacopoeia* for Kemp and Co. He was responsible for the first three editions of this publication and it continued to be published by Kemp after he left them to join Phillips & Co. of Bombay as a manager.[5] Phillips was established in

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Poona by B. Phillips, a Pembrokeshire pharmacist. Branches were opened in Bombay and in 1885 it was formed into a limited company. While in India Stephenson put his time to good use. He was elected a Fellow of the Chemical Society in 1891 and he studied the local indigenous drugs and their use, becoming an authority on these products.

In addition to his business interests he joined the local volunteer force, serving for three and a half years as a trooper in the Bombay Light Horse and then as a Lieutenant in the Bombay Volunteer Rifles.[5] On his return to this country he continued his interest in the territorial army and joined The Queens Edinburgh Rifles (Royal Scots (TF)) where he attained the rank of Captain. He retired from the Royal Scots in 1907, but he maintained his interest in army matters, as a letter to the *Pharmaceutical Journal* in 1909 shows.[14] He commented on the proposal to recruit pharmacists to the RAMC (TF) as honorary Lieutenants, which he said was only a glorified sergeant and they should be given substantive rank.

The Albert Pharmacy

Stephenson returned to Scotland early in 1902 and a year later purchased the pharmacy at 137 George Street, Edinburgh from Mr. Brown. It was called the 'Albert Pharmacy' and the shop was very traditional in appearance. It was double-fronted with a gold pestle and mortar above the door and a glass carboy in each of the front windows. He gave 'particular attention to dispensing and the manufacture of elegant galenicals and toilet articles which he brings under the notice of doctors, dentists and other professional men.'[5]

He very soon became involved with the science and, to some extent, the politics of pharmacy. He supported the North British branch of the Society, presenting a number of papers, and his name appears regularly in the *Pharmaceutical Journal*. His first contribution in 1903 was 'Some notes on the Indian Drugs of the *B.P. Addendum 1900*'[7] In his introduction he comments 'I fear that in common with other of my brethren in India I took little notice of the book beyond reading it and regarding it as a very imperfect and somewhat amusing production'. He then goes on to comment on 28 entries and three oils, concluding with the remark that 'It can hardly be said to make a step in the progress of pharmacy -- the official recognition of any of them will not alter the general consumption of any of them in their own country one way or another.'

Other contributions were more positive. In March 1904 he gave a demonstration in Edinburgh on 'Radium and Radio-activity' showing a Roentgen Ray installation and describing the physiological action of radium salts.[8] In 1908 at an evening meeting of the Society in Edinburgh he read a paper on 'Synthetic Remedies and the Next Pharmacopoeia' in which he advocated the fuller recognition of synthetic remedies so that they could be given an official name before they were sold under a trademark.[9] This, he suggested, would lead to better standardisation and help the development of suitable pharmaceutical preparations particularly in regard to their nomenclature. Substances mentioned included Acetomorphine (Heroin), Benzyl Morphine, Phenazone, Phenolpthalein and Sodium Anilarsenate.

He contributed notes on a comparison between concentrated and fresh infusions[16] and on the filling of hypodermic ampoules.[17] In 1908 he was appointed an examiner to the Scottish Department of the Pharmaceutical Society and remained an examiner until 1922, acting as Chairman of the Board of Examiners for four years.[2]

His interests in pharmacy organisation led to his being elected Chairman of the Federation of Local Pharmaceutical Associations. He stated in 1909 that 'the Federation's function was to promote union and concerted action on matters of common interest to pharmacists outside the scope of the scientific and technical subjects to which the Pharmaceutical Conference is confined'.[18]

MR. T. STEPHENSON, F.C.S., F.R.S.E., B.P.C. Hon. Local Secretary.

At the Cambridge meeting of the Federation in July 1910, Stephenson presented a paper from the Edinburgh Association.[15] His point was that the Conference dealt with the Science and Practice of pharmacy but there was in addition a need for commercial and practical matters to be dealt with. He proposed that the Conference should be divided into two sections, a science and a practical section,

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in order to deal with this problem. He further proposed that the Federation should be wound up so that the Society would be the only co-ordinating body for pharmacy. He was also Chairman of the Edinburgh and District Chemists Trade Association in 1910.[11]

Publishing

Thomas Stephenson was interested in the action and use of drugs and in pharmaceutical writing. As mentioned previously, when he was in Bombay he was the author of the first three editions of *The Prescribers Pharmacopoeia* between 1890 and 1895. At the age of 42 he wanted to expand his interests into a wider sphere than retail pharmacy and in particular to further his interests in writing. In October of 1906 he launched *The Prescriber* from his pharmacy premises at 137 George Street, Edinburgh. This was described as 'a monthly journal dealing with therapeutics, pharmacology and the newer remedies'.[4] Initially this had a local flavour and it carried a list of telephone numbers of the local hospitals and nursing homes.

The first volume of 1907 and the January issue of 1908 carried advertisements, although none appeared after the January issue. Thomas Stephenson was prominent as an advertiser, with a half page promoting his Malt and Haemoglobin as the perfect vehicle for administering iron in a highly soluble and assimilable form.[4] Stephenson also advertised 'Levico', a natural arsenio-ferric water from the South Tyrol. Other items advertised were Nesbit's Aerated Waters supplied by John Nesbit, pharmaceutical chemist, 236 High Street, Portobello and Swan Fountain Pens. Chloroform, Tela Vesicatoria and Emp. Canth. Liq., two vesicants, were advertised by T&H Smith with their addresses given as 21 Duke Street, Edinburgh, 22 City Road, London and 37 Washington Street, Glasgow.

The introduction to the first issue set out the reasons for starting this new journal and it may be worth quoting this in full as it details Stephenson's thoughts at the time.[4]

> In presenting the medical profession with a short monthly epitome of therapeutic progress, the Editor believes that he is supplying what has long been wanted by the busy practitioner. Information which is scattered through out the various Journals cannot always be assimilated at the time of perusal, and the difficulty of reference to a note one has 'seen somewhere' is well known. Moreover, in the absence of full details as to the pharmacy of the newer drugs, prescribers are often led either to leave them untried or to order some secret preparation of which little is known beyond the statement of the advertiser.
>
> The object of this publication, therefore, is to render to medical men that assistance which properly comes within the sphere of the pharmacist, by presenting a series of short articles dealing with the pharmacy of the newer medicines, giving concise and authoritative notes as to their properties and doses, with lists of suitable preparations to assist the prescriber in their administration. All statements made in these pages will, wherever possible, be fully verified experimentally, so that the information given may be relied upon, and it is hoped in this way a compilation will be furnished which will be most valuable to prescribers in their daily work.

In this way Stephenson set out his stall. Up to 1910 the publication consisted of notes and abstracts. Generally these were not acknowledged although occasionally initials were used and it is likely that Stephenson was largely responsible for the publication and its contents. From 1911 original papers were printed under the authors' names and from 1913, volume seven, full acknowledgement was given on the title page to all those associated with the work. Some nineteen names are listed (see Appendix 1).

Much of the content was concerned with the medicines of the day. The first volume carried articles on Haemoglobin and on the use of Scopolamine-Morphine in anaesthesia as an alternative to chloroform, as there had been a number of cases of poisoning with the latter. It was a time when there was a great interest in the secret remedies which were being introduced and the Journal ran a series giving the formula so that 'secret remedies do not have to be prescribed'. The first substance mentioned was acetyl salicylic acid as a substitute for 'Aspirin'. Stephenson continued his interest in Indian drugs and ran a series on these starting with isphagul seeds.

Many different matters were dealt with. In 1911 there is an interesting report on a case of Phenacetin poisoning. The patient took 8 cachets of Phenacetin 9 gr and Caffeine 1 gr. The symptoms were collapse, nausea and giddiness. This was treated with 2 ounces of whisky and injection of 1/20 gr of strychnine. The symptoms passed away within three hours. Next day the patient was depressed, but by the third day had completely recovered.

An innovation started in the February 1913 issue was the first instalment of a series of articles on prescriptions for insured persons compiled in accordance with the *Tariff for Drugs* listed under their therapeutic action. It was stated that these would be useful for doctors on the NHI panel and that they were all acceptable to be ordered on the green form. The following are some examples:

Amenorrhoea
R Pil. Aloes et Ferri xxiv
Sig: 1 tid. pc.

Anaemia
R Liq. arsen. hydroch. ii drachms
Syr. Ferri Phos. Co. (BPC) x drachms
Sig: i drachm tid. post cib.

Asthma
R Pulv. lobeliae co. BPCi ounce apothecaries.
Sig: A little to be burned on a plate and the fumes inhaled.

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Bronchitis, Acute

R	Tinct. Camph. Co.	iv drachms
	Vin. Ipecac.	ii drachms
	Spt Aeth. Nit.	iv drachms
	Syr. Scillae	iv drachms
	Aq. ad	vi ounces

Sig: ss ounce tid. ex. aq.

Diarrhoea

R	Pil. Plumb. c. Op.	iii
	Sig: i. m.d. sumend.	(*more dictu* - as directed)
R	Tinct. Opii	ii drachms
	Tinct. Catechu	ii drachms
	Mist. Cretae ad	vi ounces

Sig. ss ex aq. ter die. s.o.s. (*si opus sit* - if there is a need)

Insomnia

R	Malourea (BPC)	gr. x–xv.
	Ft pulv., tales iii	
	Sig: One at bed time in a warm drink.	

Note. malourea is the chemical equivalent of veronal; if veronal is prescribed as such it must be ordered on a pink form. (Green for NHI scripts.)

From the first issue of 1914 the publication expanded considerably. It was increased in page size and in the number of pages. The *South African Medical Record* commented:

> *The Prescriber,* a medical publication which began very humbly, has now been considerably enlarged and includes new sections dealing with therapeutics and treatment in their latest developments. This publication is rapidly coming to the front, mainly the reason of its being extremely practical. It is easy reading, and there is an entire absence of anything like padding.

The Prescriber filled a need and continued to be held in high regard; it continues to be published to this day.

Despite the time taken up with editing *The Prescriber*, he continued to run his pharmacy. In 1912 the British Pharmaceutical Conference paid its third visit to Edinburgh and Stephenson was the honorary local conference secretary. In return for his work in organising the conference and its social activities he was presented with a silver cigar and cigarette box.[19]

In that year, his was the only pharmacy left in George Street although he had to compete with the Civil Service Supply Association Ltd's chemists department which was on the opposite side of the road and which had employed several local pharmacists from time to time. He still had his father's old recipes and prescription books and had a large share of the 'good West End trade'. As an examiner for the Pharmaceutical Society he had a reputation for fairness even among 'ploughed' candidates.[20] During the year he was elected a non-resident member of the 'Société Chimique de France, Paris.'[21]

Rotary

The year 1912 also saw another new development in Edinburgh. On Monday 23 September the Rotary Club held its first meeting at 6.15 pm. Rotary was an American innovation and an Irish American, W. Stuart Morrow was involved in the setting up of the club. He had already started clubs in Dublin, Belfast and Glasgow in addition to Edinburgh. He was paid on the basis of a commission on the membership fee paid by each member, and as the membership reached 140 within three months he found this to be a profitable undertaking. So much so, that he decided to move on to found a new club in Liverpool. Thomas Stephenson had joined the Edinburgh club on 9 January 1913. It was decided to choose a Secretary from the members of the club to replace Morrow and Thomas was fortunate in being elected.[22]

The original concept of Rotary, brought from America, was based on commercial benefit. Membership of each branch was to be confined to one member representing each profession or type of business and 'the primary object of the club should be the promotion of the business of its members.' It was expected that members would give their business to a member of Rotary whenever possible. Stephenson, together with the President and the members of the committee of Edinburgh Rotary, considered the implications of this policy. It was agreed that self interest was a poor objective for the club and would alienate all those who were not members. Consequently the objectives were changed to promote service to the community and fellowship as their main aims, with the slogan 'service not self'.[23]

Stephenson visited the other clubs including Glasgow, Belfast and Dublin where the management and the objectives of Rotary were discussed. The ideal of service and fellowship was well accepted although the original idea of supporting business remained for some time. This included a weekly 'boost prize'. A name was drawn from a bag and that name was given as much business as possible from his fellow members during the following week.

Stephenson's interest and the work he carried out for Rotary continued to grow. In 1913 he attended the Rotary Convention in Buffalo, USA with four other British members. By 1913 there were eight clubs and it was decided to form a federation of British Clubs. The British Association of Rotary Clubs was formed in 1914 with Thomas Stephenson as Honorary Secretary. One month after its formation Stephenson sailed on the SS Mauretania to attended the Rotary Convention in Houston in his capacity as secretary of B.A.R.C. and the official British delegate.[12]

With the outbreak of war in August 1914, the President Sir Joseph Dobbie thought that the club would have to be closed for the time being. However Stephenson was of the opinion that if their aim was service to the community, this was an opportunity for them to be of help. A number of committees were formed and all those who were not eligible for active

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service became involved in one or other of the many projects. A major undertaking was Christmas treats for children, when for five seasons some 6000 children of servicemen were entertained at the leading Edinburgh theatres, and after the performance toys and sweets were distributed.[23]

The club formed the Roseberry recruiting campaign, with Lord Roseberry as Honorary President. The committee raised, drilled, equipped and mobilised a 'Bantam' Battalion of 1350 men who went out to France as the 17th Royal Scots.

As well as being much involved in these activities Stephenson published the first edition of *The Rotary Wheel* in January 1915. At the meeting of B.A.R.C. held in Edinburgh in May of that year, Stephenson handed over the Treasurership to R.W. Pentland who had been the President for the 1914–1915 period, but retained the post of Honorary Secretary and now Editor. He was much involved with the fund-raising activities of the club and it is reported that he had a busy time with Mr Harry Lauder who was invited to a lunch, at which Mr. Stephenson appealed for tobacco pipes for soldiers in the Dardanelles. 'A goodly sum was obtained.'[24]

In 1915 he published *Rotary: its History, Interpretation and Possibilities*, which went into eight further editions. He continued to run his pharmacy and take a keen interest in pharmaceutical matters. In 1915 he published the first edition of *Incompatibility in Prescriptions* and this went on to be published in six further editions.[30,31] He also continued to publish *The Prescriber* although by this time he had a number of associates who were producing abstracts and notes for the journal.

In early May 1918 Stephenson was appointed Secretary of B.A.R.C. on a part-time basis on a fixed salary based on 20 clubs. The salary would be increased for each club over this number. The secretary was to supply his own office and assistants. In the event, Stephenson found his salary only covered the cost of one secretary and he insisted that he should continue to be described as Honorary Secretary.

In January 1918 Stephenson wrote an editorial in *The Rotary Wheel* calling for a large British delegation from Rotary to attend the Rotary Convention to be held in Kansas City that year.[25] In the end only two members went, Thomas Stephenson as the Honorary Secretary and Editor and Home-Morton the Vice-President of B.A.R.C. The British Foreign Office offered special facilities to them to act not only as representatives of Rotary but also as representatives of the British Government,[13] 'with a view to linking up both sides of the Atlantic in our great war effort.' On 31 May Stephenson and Home-Morton embarked at Liverpool for their trip. After attending the meeting at Kansas City, which was attended by 4034 Rotarians and their ladies, they then went on separate journeys. Home-Morton visited Rotary Clubs in the East and Middle West, while Stephenson visited those on the West Coast. They met again in Washington to attend a meeting of the International Board to discuss the relationship between the I.A.R.C. and B.A.R.C. While in Washington they were received by President Wilson.

The Ministry of Information received a report from Major Ian Hay Beith (Ian Hay the novelist) who was an agent in the USA which said 'Home-Morton and Stephenson have been making excellent impressions here and doing a whole lot of good'.

Stephenson continued his work in pharmacy and in Rotary for a number of years. He was responsible for opening sixteen Rotary Clubs throughout Great Britain and he acted as an examiner of the Pharmaceutical Society in Scotland until 1922. The Rotary Club of Edinburgh was the organising committee for The Edinburgh Society for the Promotion of Trade. In 1921, in conjunction with the 'Edinburgh Chamber of Commerce and Manufactures' they issued a book entitled *Industrial Edinburgh*.[26] The preface explains that this was 'in furtherance of the movement in favour of developing new industries and extending existing industries in Edinburgh, Leith and the Lothian's.' Thomas Stephenson was the editor.

There are a number of chapters extolling Edinburgh and the surrounding area as ideal for the development of new manufacturing industries. Alex Johnston, the managing director of the North British Rubber Company, said that the great textile industries had no representative in Edinburgh. Interestingly he pointed out 'complete success in the manufacture of cotton goods has long been recognised to depend to a material degree on the atmospheric factor; and in this connection passing reference may be made to the fact that the atmospheric conditions obtaining in Edinburgh are considered by experts to be no less favourable than those prevailing in Lancashire' – a recommendation which today might not be appreciated by the Scottish tourist industry.

In 1920 he underwent a successful operation for gall stones, but in the same year he did not seek re-election as Joint Secretary of the Edinburgh Rotary Club although he continued as Secretary of B.A.R.C. In 1921 he retired from this post due to ill health and the headquarters were transferred to London from Edinburgh.

In 1922 he graduated as a Doctor of Science. His thesis was entitled *Pharmacology of the Indian Drugs*.[28] On 9 March in the same year he addressed the members of the Scottish Pharmaceutical Federation in Edinburgh. His subject was 'Pharmacy and the Community' and he commented on the pharmacist's relationship with the doctor, patient, wholesaler and other pharmacists.[27] He recommended that pharmacists should keep their knowledge up to date and be prepared to give the highest level of service to their customers whom they should treat as friends,

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allow them to use the telephone if they wish, and have some postage stamps available for their use if they need them.

His comments on the relationship of pharmacists with their wholesalers and other pharmacists are revealing. Most pharmacists, he said, regarded the wholesaler as 'wicked profiteers'. These same pharmacists however act as if the wholesalers were the source of cheap money, for they take undue credit for goods purchased and this is the equivalent of borrowing money without interest. On his fellow pharmacists, he said that throughout Edinburgh pharmacists expected to borrow stock from their colleagues without any extra cost. He recommended that in these cases the pharmacist who supplied in an emergency, should be allowed to add a modest percentage to the cost.

He continued to publish *The Prescriber*, run his pharmacy and be involved in Rotary. He was elected President of Rotary International in Great Britain and Ireland in 1927 and he became the first Vice President of Rotary International in 1928.

Thomas Stephenson died on 29 October 1938 aged 75 years.[33] From his obituary we learn something about the man. 'He was neat and orderly and had a love of the arts, especially music and literature. He had a considerable interest in history, the great novelists, music and opera, especially in the works of Gilbert and Sullivan.[32] He was President of the Gilbert and Sullivan Society from 1927 to 1929.[19] and he also contributed a series of articles to *The Scotsman* on the subject.'

Thomas Stephenson did not find pharmacy restrictive. It was a stepping stone to a wide interest in many matters. I should like to close with a quotation from a paper[29] on ethics he gave in 1910:

> possibly from the nature of their calling, pharmacists as a class have more difficulty to convene in a general meeting than any other class of the community. The result was a certain narrowness of view and isolated action.

Stephenson cannot be accused of this failing; he was certainly 'a man of parts'.

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Appendix 1

Associate Editors, Contributors, Abstractors and Reviewers for *The Prescriber* 1914

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W.M. Crofton, MD, Dublin.
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Philip A. Harry, MD, DPH, Rochdale.
Henry A. Harrower, MD, London.
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John Orr, MD, FRCPE, Edinburgh.
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James Scobie (late), MB, ChB, Dollar.
J. Gordon Sharpe, MD, Leeds.
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The Thomas Family of North Wales

Dr J. Burnby

I was spurred into this exercise in genealogy by the illustration in the December 2001 number of the *Pharmaceutical Historian* with its illustration of Treachers of Bombay [vol. 31(4) p. 62].

Dr J. Burnby speaking at the 2002 Cardiff Conference

The story begins towards the end of the eighteenth century in the village of Pentre Voelas, once an important stopping place on the A5. There, according to the fly-sheet of *my* grandfather's copy of *Highways & Byways in North Wales* (1901) lived 'old John Thomas (my great grandfather) a chemist manufacturing potashes from ferns & dyes from lichens for the Lancashire trade.' In fact John Thomas was not 'old' at all as he was only 39 when he died in 1833, according to the gravestone in Pentre Voelas churchyard. His son, William Thomas I, ran the local shop where no doubt he sold everything which can be imagined, from sheep dip to the popular 'patent' medicines of the day. His brother Robert had a pharmacy in Turf Street, Caernarvon (*Pigot's Directory*, 1829) and it was with him that his son William Thomas II was apprenticed.

Robert was an irascible man, and the story goes that when William IV came to Caernarvon to open Telford's new bridge across the Menai Straits to Anglesey in 1826, the king found he had lost his voice. A messenger was sent hastily to Robert's pharmacy and the king was supplied with a gargle which proved effective. Robert argued then that as he had supplied a medicine to royalty, he was allowed to display the Royal coat of arms. This he duly did -- but on the ceiling of the pharmacy!

The apprenticeship was by no means peaceful. My grandfather wrote in a letter which I still possess 'Re the old shop at Caernarfon. [Note the Welsh spelling] Old Robert Thomas was my father's uncle, brother to old William Thomas (of Pentrevoelas). My grandfather and my father were apprenticed at that very shop to Robert Thomas. Yes, the old boy was a proper old Tory. On election day he used to send my father to the cellar to pick out the different grades of Gum Arabic, as he was such a radical. I have heard my mother relate the tale many times.'

However, I have the old apprenticeship papers of William son of William Thomas I of Pentre Voelas which give an interesting twist to the story. Richard Lewis Owen, the son of another chemist and druggist in Turf Square, Caernarvon, William Morgan Owen, became the apprentice-master for five years as from 30th June 1837 of William II. This indenture was in fact back-dated because it was not obtained until 1 November 1837 and finally signed on 23 July 1838, a practice which was regrettably common. It would seem probable that the Owens had bought out the Robert Thomas pharmacy, especially as one of the witnesses has the signature of Robert Thomas of Erw, Caernarvon.

Although there is no record of this, it seems that William Thomas I had at one time also been bound to Uncle Robert, but never finished the apprenticeship, possibly because of the death of his father, John. This did not prevent him from displaying and airing deep pharmaceutical lore. The family was then living at Cernioge Mawr, a large stone-built house outside Pentre Voelas which was run as a coaching inn and was a favourite stopping place on the present A5. It was strongly believed that Sir Humphry Davy stayed there for some days, possibly en route for Ireland, where he particularly enjoyed the fishing. On one occasion, William I and he were in conversation which soon led to argument. William ended up by saying 'I know I'm right for I have read Humphry Davy's book on agriculture'. The following morning, the coaches having left, William found on his doorstep a book, and written on the fly-sheet was 'With the Compliments of Sir Humphry Davy'!

When William II left Caernarvon, he went to Bala in Merionethshire, which was a sensible move because at that time Bala had no less than ten fairs a year. There he soon made his mark. His pharmacy was in the High Street, where he did not content himself only with the sale of pharmaceuticals for humans, but also those for horses and cattle; he also sold water-filters, ironmongery and some groceries. In 1862 he published an almanack [of which I have a copy] and also made two very popular sauces which he named Thomas's Tegid Sauce (Tegid is the Welsh name for Lake Bala)and Thomas's Merioneth Sauce, making as much as 20 gallons at a time. He was also active in trying to promote the Bala-Corwen Railway. Not content with all this, he became High Bailiff to the Court at Bala, and was the elected prospective Liberal candidate. I have the diary he kept in the last year of his life which makes fascinating reading. [Written in English, although he was a Welsh-speaker and did not speak English until he went to a grammar school.] Among other purposes, he used it as a poisons register:

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5 April 1863.
'Sold one ounce of arsenic coloured with indigo to Thomas Jones Esq. of Llanfor to destroy Rooks.' (Signed by Thomas Jones)
1 January 1863 - Thursday. [The first entry]
'Much rain and very stormy. London Mail does not arrive until 1.35 p.m. Confined to my room with Gout in left foot. Commenced making A/cts'
5 Jan. 1863
'D. Jones wheeling Lime and refuse heap in the Garden to be ready for mixing. Better in health and swelling in foot much reduced. Continue making A/cts. Sent Empty C[as]k to Beaufoy & Co., London and 2 ditto to John Mathews & Co, Hatton Garden Works & Liverpool.
4- May 1863.
'D.D. employed sowing Swedes in the Green.'
8 May 1863.
'William Imet, Flourdealer, Tegid Street made Bankrupt yesterday in Liverpool. Spit some blood at about 8.50 a.m.'
9 May 1863.
'John Bright M.P. called respecting Amnodd Mines. D. Davies finishes forking Garden. Receive and Commence using a bag of chicken Rice.'
18 May 1863.
'County Court Office removed from the rooms over my warehouses in Mount Street to the rooms in High Street on the ground floor adjoining my Shop.'

When he was 32 he married the 35-year old Jane Wynne of the neighbouring village of Llandrillo, where her father was a farmer and innkeeper of the Blue Lion. She quickly presented him with three children, Jane Wynne Thomas, Arthur William Wynne Thomas and Llywelyn Lloyd Thomas; as can be guessed both the boys became pharmacists, and the daughter taught domestic science. Unhappily this dynamic man died when he was only 39 on 29 July 1863,leaving his widow with three young children to bring up. Furthermore, he had been in the process of buying his shop and land which complicated matters. His 'Stock in trade' and the shop fixtures were valued at £566 3s. 10d., the valuation being carried out by his old apprentice-master, Richard Lewis Owen of Caernarvon. The 'Book Debts' amounted to £300, the whole of his assets were just under £1305, so that the balance in hand was almost £520.

The widow was thus entitled to £173 and each of the three children £115 10s. Nothing dismayed, Jane continued the pharmacy in Bala and there are still extant two invoices addressed to her, but in a very fragile condition. one is from 'Evans, Sons & Co., Wholesale Druggists', and the other from 'Woodall & Jones', both of Liverpool, the goods having to be sent by rail to Llangollen. She ran the Bala pharmacy until 1884 after which time she lived with her elder son, Arthur, in Liverpool, but nevertheless remained on the register until 1902.

Llywelyn, her younger son, qualified on 25 April 1883 as a Chemist & Druggist, No. 5338, after an apprenticeship with John Dutton of Birkenhead. He worked with Vines & Froom Ltd of Aldersgate Street in London for several years and then bought a business in Wallasey, Cheshire. Within a short period he sold it, then he went out to Treacher's of Bombay as 'Head of the Laboratory'. This lasted an even shorter time, for he developed dysentery soon after landing in 1889 and returned to England.

[I still have the large box with iron handles which was specially manufactured for 'Those going out East'.] He must have returned to his old haunts in the Wirral for on 12 June 1889 he married Jane Elizabeth Williams of Wallasey, the daughter of a master grocer. The same year they moved to Worcester where their daughter, Jane Wynne Thomas, was born in June 1890. Needless to say she qualified as a pharmacist in June 1918. Llywelyn in the meantime had moved to the Potteries where he had several pharmacies at different times in that area, and finally settled in Middleton, just north of Manchester.

As for my father, Gwilym Lloyd Thomas, he registered as a Chemist & Druggist on 6 July 1916, and he held excellent positions with Genatosan Ltd, J.W. Simpson Ltd and Oppenheimer, Son & Co. Ltd of Clapham Road, London.

Concerning myself, well of course I became a pharmacist. I was apprenticed to E.J. Latimer & Son, a busy and well appointed pharmacy in the Market Place of Loughborough, and duly qualified on 17 July 1946 as a Chemist & Druggist. After a year with John Richardson's of Leicester in the galenical and the analytical laboratories, I went back to Leicester Technical College in order to take the B.Pharm. Unfortunately illness overtook me during the following years so that I spent much time in and out of hospital with ulcerative colitis, but in due course the tables were turned, and I became a hospital pharmacist.

Well one might say that the family is in a rut, all five generations of them, and six if one counts the maker of potashes.

Scotland on Film.

BBC Scotland has made available, on the Internet (www.bbc.co.uk/scotlandonfilm), a comprehensive archive of sound and film which covers the 20th Century. They have also introduced a forum to enable anyone to submit their own experiences of life during the century.
There is a section on 'Health' but so far there have not been any contributions from pharmacists or about pharmacy. Members living anywhere may wish to look at the archive, while members living in Scotland can add their own reminiscences of life in the earlier part of the century. The BBC hopes that they can build this up to be a major archive of personal experiences during the past hundred years. While at this time it is only for Scottish archives, they believe that if it is a success it will be extended to cover the whole of the United Kingdom.

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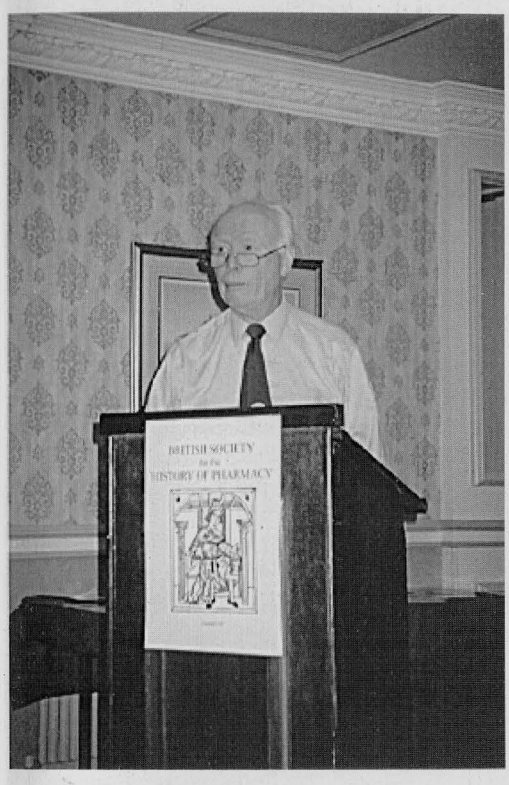
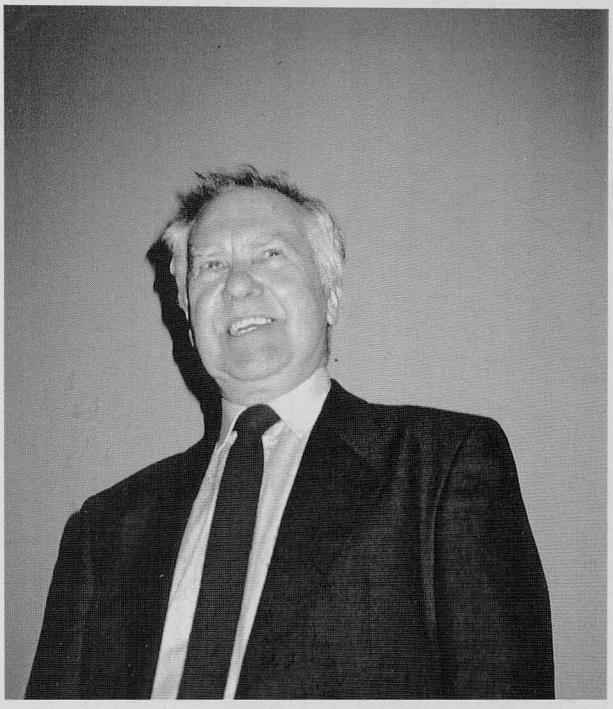
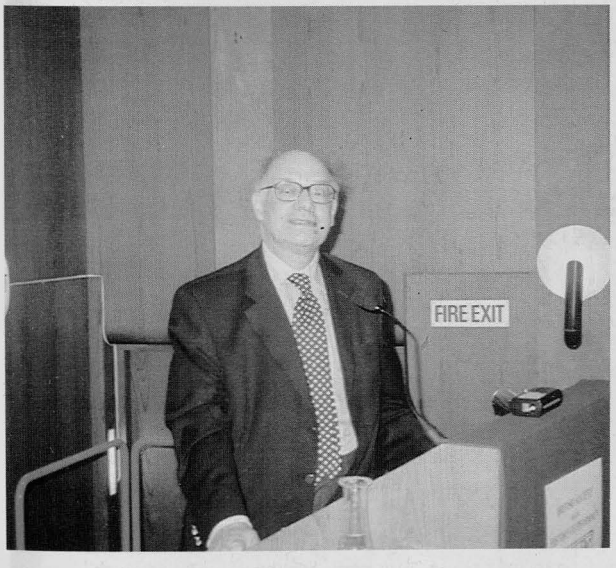


Dr Terry Turner speaking on The Welsh National Botanic Garden at the Spring Conference April 2002



Prof. Roy Church from the University of East Anglia, speaking on the Early History of Burroughs Wellcome in March 2002



Dr Tim Hunt speaking on Opium in the Fens in May 2002

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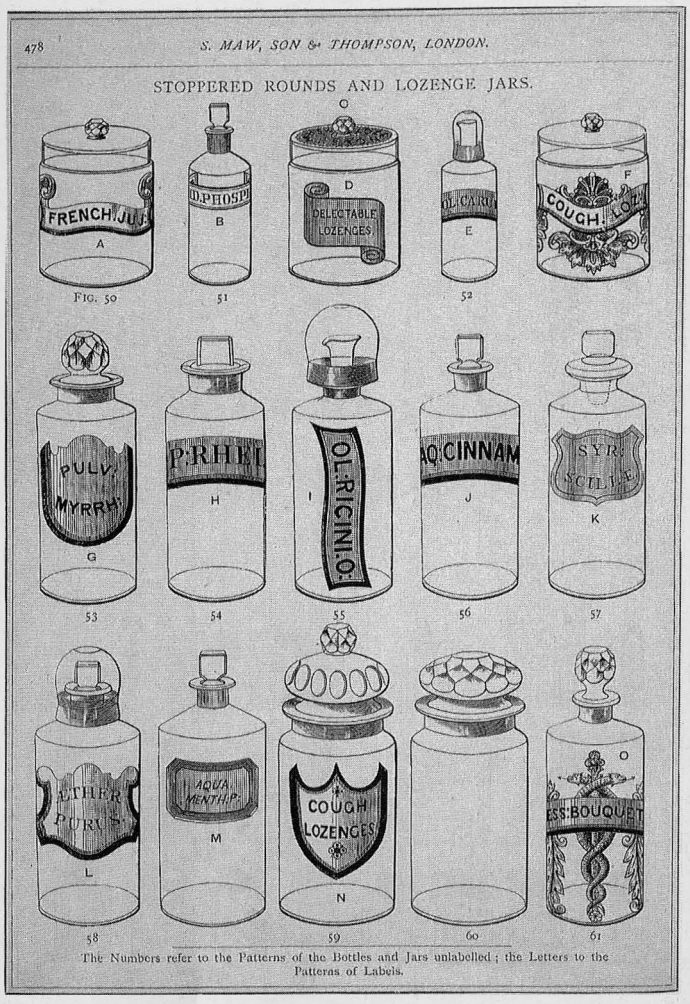


Postcards and greetings cards from the Museum

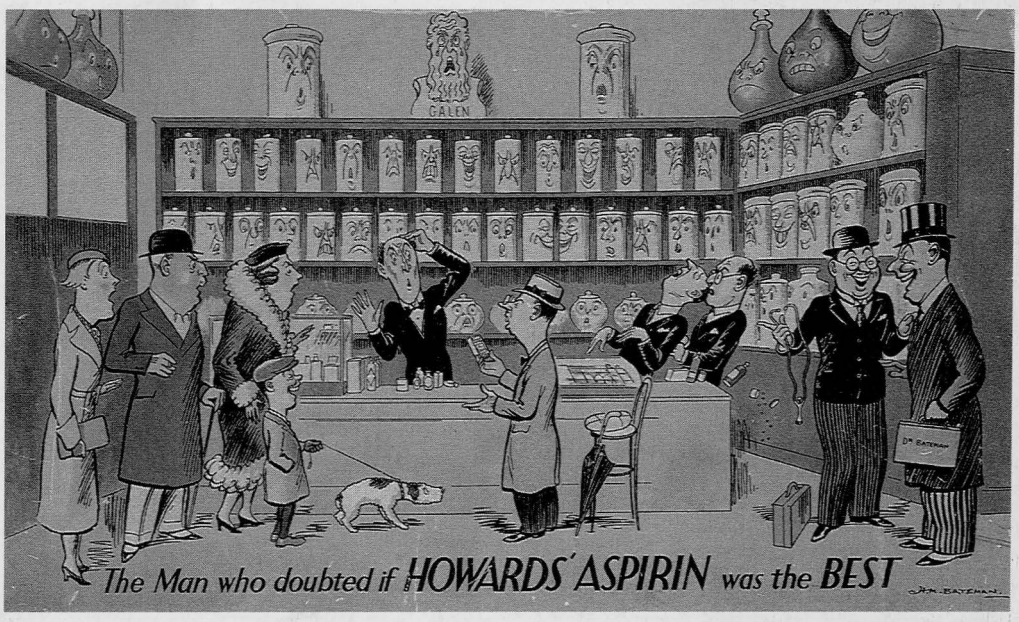
A range of 24 postcards and 4 greetings cards is on sale on behalf of the Museum from the Library issue desk at 1 Lambeth High Street. All the cards show images or objects from the Museum's fine collections.

The cards depict a variety of historical and pharmaceutical subjects. They include caricatures from the 18-19th century, images of pharmacists and pharmacies, cartoons and illustrations of pharmacy equipment and drug jars. Postcards price 35p each; card with envelope 80p each.

The examples on this page are reproduced with permission.

Left: 'Stoppered rounds and lozenge jars' from S. Maw, Son and Thompson's 1882 wholesale catalogue.

Below: 'The Man who doubted if Howard's Aspirin was the Best'. An advertisement by cartoonist H.M. Bateman (1887–1970).



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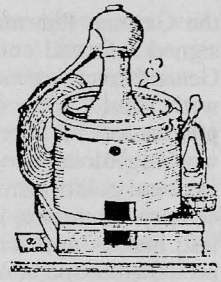

Contents

Diary

Wednesday 16 October 2002
Joint meeting between BSHP and the Hull Pharmacists Association. 'Those Magnificient Men and Their Medicine Machines: The Glorious History of Pharmaceutical Invention'. Dr Stuart Anderson, vice-president BSHP. At The Beverley Arms, Beverley, E. Yorks. **NOTE change of start time: 7 pm.**

13 November 2002
A Visit to the Society of Apothecaries, Blackfriars

Dates of future meetings at RPSGB Lambeth
5 February, 5 March, 1 May 2003

11–13 April 2003 BSHP Annual Spring Conference
To be held at Kings Manor Hotel, 100 Milton Road East, Edinburgh EH15 2NP.

International Society for the History of Pharmacy
The next meeting of the International Society for the History of Pharmacy will be the **36th International Congress** in Bucarest, Romania in September 24–27, 2003. Details can be obtained by filling in the form on the copy of News Letter number 3 sent to all members or from the International Society website at **www.histpharm.org**

Christiane Staiger, MRPharmS and a member of BSHP, was awarded a PhD in March 2002 by the Philipps-University in Marburg with a thesis in the history of pharmacy entitled 'Zur Geschichte der gesetzlich geregelten Weiterbildung für Apothekerinnen und Apotheker in Deutschland'. It discusses the history of specialisation in pharmacy. Although the title mentions Germany, the study has a large chapter about specialisation in other countries, in particular in Europe and the USA and will be printed as a book. The supervisor of the thesis was Prof. Dr. Christoph Friedrich, Institute for History of Pharmacy, Philipps-University of Marburg.

Professor Peter Isaac. It is with great regret that we report the the sudden death of Professor Peter Isaac of Wylam, Northumberland. Although qualified in engineering, he was a regular attender at BSHP conferences and gave several papers on the printing and publishing activities of pharmacists and booksellers.

Cain and Abel or Siamese twins ?: Defining essential conditions for a successful cooperation of physicians and pharmacists in the 21st century - an historical approach

Axel Helmstädter and Christiane Staiger

Both physicians and pharmacists work on patients' care. Their mutual responsibilities are well defined, but their areas are closely connected and overlap when drug-related questions occur. The physician diagnoses and chooses a treatment; the pharmacist as the drug expert dispenses medicines and is able and obliged to educate professionals as well as the public about drugs thereby optimising therapy outcomes. Moreover, the professional expertise of pharmacists can be useful for the physicians' decision-making process. In this context, it has been stated that the professions should be like 'Siamese twins',[1] but also that 'a fruitful interaction is more often the exception rather than the rule in today's practice of healthcare'.[2]

A close relationship between both health-care professions could result in a clear benefit for the patient. Therefore, many opinion leaders try to foster the physician–pharmacist interaction. For example,

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the German Pharmaceutical Association recently signed a formal contract with the Organisation of General Practitioners to improve cooperation, starting with round-table discussions.[3] Physicians and pharmacists all over the world see an advantage in working closely together. Improving their professional relationship is a challenge for the 21st century. Therefore, it seems worthwhile to go back into history and scrutinise the circumstances that promoted cooperation. These 'lessons from the past' should be useful in defining optimal conditions for a fruitful professional interaction, recognised as essential to further improve patient care.

Our aim is to identify historical situations where a fruitful cooperation between the two health professionals existed. We are well aware that the situation in Britain might be different from that on the continent or in other countries. There, the clear distinction between the tasks of pharmacists and physicians has a long tradition. Today, dispensing doctors, prescribing pharmacists or pharmacy dentists are rare; in Germany they do not exist. However, health politicians continue to discuss these issues.

Harmony and Hierarchy

At first sight, close relationships between the two professions seem to be nothing new. Mythology tells the story of two brothers named Cosmas and Damian who are now the patrons of medicine and pharmacy. They lived in the third century AD. and were said to work wonders, e.g. transplantation of a leg from a negro to a white patient. They died martyr's deaths about the year 300. Countless paintings and sculptures show both brothers living together in harmony, Cosmas carrying equipment for urine diagnosis and Damian with mortar and pestle in his hands. Thus they symbolise diagnosis and treatment, and became Christian patrons of physicians and pharmacists, respectively.[4,5]

However, in early pictures of the pharmaceutical environment, pharmacist and physician are portrayed discussing the medicine being made up. In fact, in the early centuries of pharmay practice, doctors used to visit the pharmacy for prescribing. From Islamic as well as European civilisations, engravings from the thirteenth century onwards show physician and pharmacist working together.[6] In most cases the physician points to specific drug jars. This gesture as well as the usually completely different clothing clearly shows that the artists assume a tremendous social difference between the portrayed people.[7] Such differences really existed, caused for example by differences in education: medicine has always been an academic discipline whereas pharmacists were educated and organised as craftsmen until the early nineteenth century. In early times, pharmacists had to swear that they would follow medical instructions closely. Until recently, pharmacies were regularly reviewed by a committee of physicians. The hierarchy is also mirrored in literature, poetry and arts, which used to characterise the pharmacist as the physician's subordinate.[8,9] So far, this fact has dominated historical approaches to investigating physician–pharmacist relationships.

Many historians quote an appendix to the first official German pharmacopoeia, the *Dispensatorium* by Valerius Cordus, edited in Nuremberg 1546, titled 'How a pharmacist should be'. This paragraph describes the dispenser as the 'physician's right hand', the *dextra manus medici*.[55] The author, Jakob Sylvius (1492–1553) clearly sees the fact that the success of drug treatment depends on the pharmacist's reliability.[56] Three centuries later, the British physician Thomas Percival analogously wrote:

> On the knowledge, skill and fidelity of the apothecary depend, in a very considerable degree, the reputation, the success, and the usefulness of the physician.[12]

On the other hand, mistakes in dispensing could ruin the physician's reputation. Therefore, according to Cowen:

> the physicians demanded not simply that the pharmacists properly fulfil their function and not trespass, but that they recognise the superior authority of the physician in all medical matters.[13]

Reflecting the situation in the Austrian county of

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Steiermark, the author of an article published in the 1920s pointed out the fact that physicians acted as pharmacy supervisors for a very long time although pharmacists were a completely separated profession there at least from the end of the 16th century.[57] This is also evident from regulations where pharmacists had to swear that they would respect the physician and his instructions. Besides this, the relationship between the professions was burdened by the mutual violation of responsibility borders. On the one hand, this refers to physicians as owners of retail pharmacies, which was still possible in late 17th century Austria. On the other hand, pharmacists often worked therapeutically. This has mostly been tolerated, in some cases approved, where no physician was locally available. Where both professions worked in a close environment, disputes about mutual qualifications appeared now and then. In 1752, a physician in the city of Bruck complained that pharmacists wrongly made up the prescribed medicines in order to harm the local physician. On the other hand, pharmacists complained about too little prescription volume by single doctors. According to that Austrian study, this kind of trouble mainly occurred where in a defined environment, for example a small town or village, a single pharmacist faced a single physician. This held even more true when financial competition was involved. The situation seemed to be much more easy where each profession was represented by more than one person.

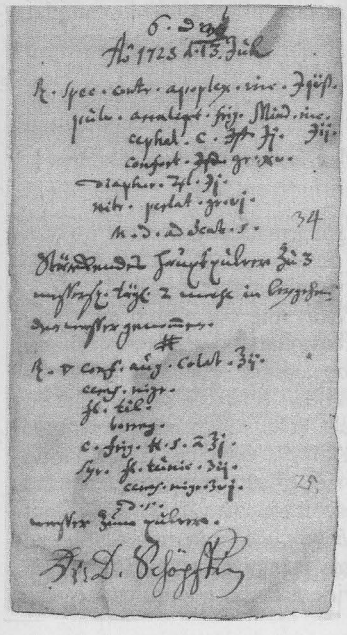
The great German pharmaceutical historian, Rudolf Schmitz, published an extensive study of the relationship between pharmacist and physician while still in his early years as a university teacher in Marburg.[10]. His opinion has strongly influenced the historical point of view in Germany up to the present day. Schmitz referred to the situation in the 13th century, commonly known as the period of separation of the pharmaceutical profession from medicine. Actually, this process seemed to him to be more a delegation of unfavoured tasks like preparation and storage of medicine to subordinate personnel than a fair distribution of responsibilities. This is clearly described in medicohistorical literature of the 17th century. The characterisation of the pharmacist as *dextra manus medici* which has its origin in the mid 16th century has mostly been understood to mean that the pharmacist acted as a subordinate assistant of the prescribing physician. This was also explained by obvious differences in education. Schmitz quoted a dialogue dating from about 1530 where both professions were discussing botanics. The medical profession claimed to rely on deeper insights based on scientific literature whereas pharmacists were said to act only on an empirical basis. According to the historian, these arguments are close to recent ones describing pharmacists mainly as pill manufacturers or managers of drawers filled with the products of industry. Schmitz recommended members of his own profession to show more self-confidence and not to overemphasise their commercial interests. It is obvious that a great deal of scientific knowledge about drugs is not covered by medical education. This potential should be used for optimisation of treatment. The physician will, however, keep the overview about the disease, its treatment possibilities and the patient's condition.

In another article which appeared 15 years later, Schmitz came to similar conclusions.[11] He discussed the term *dextra manus medici* in detail and showed that the subordinate character of the pharmaceutical profession was mainly based on the lack of adequate academic education which persisted up to the early 19th century, when many pharmacists were recognised as outstanding scientists, for example in the field of alkaloid chemistry. Improved communication is, however, seen as the key for successful cooperation. Under the circumstances of the 21st century which are mainly characterised by a tremendous increase in industrial influence on drug manufacturing, distribution and even information, communication opportunities need to be more actively sought than before. It is well known from history and tradition in China that doctors only prescribed medication while being physically present in the pharmacy. This obviously offers a great opportunity to discuss composition, usefulness and, if appropriate, alternatives with the pharmacist. This aspect seems even more important now, taking into account the tremendously increased amount of scientific knowledge about drugs.

Prescribing

As already mentioned, in the early days the physician came into the pharmacy in order to instruct the pharmacist regarding the composition of a medicine.[7] This personal contact gave the opportunity for discussions besides the daily small talk. Later, the personal visit by the physician was substituted by a piece of paper: the written prescription. The pharmacist had to fulfil the prescriptions and to carry out the physician's orders unless there was any danger for the patient's health. As a result the direct contact was often lost.

By changing the oral form of instruction into a written form another important effect occurred: the physician wrote his prescription order and handed it to the patient, who took it to the pharmacy. Thus, the patient became the link between the pharmacist and the doctor by carrying the prescription to the pharmacy.



This is why communication issues became more and more relevant for both health professions.[15,16] For community practice it has been important that the chain of

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information from physician–patient–pharmacist has become rather a triangle.[17] In the nineteenth and twentieth century great efforts have been made to strengthen medical-pharmaceutical communication.[18,19]

Another 'mixed' version of the above prescribing procedure was common in Europe until the late eighteenth century. A prescription book was located in the pharmacy. The doctor came into the pharmacy in order to make his prescription in written form.[20]

Essential services

A sign of good cooperation is when pharmacists offer the physician services which are essential for the decision-making process in therapy. Clinical chemistry or toxicological analyses are traditional working areas for pharmacists, particularly in hospitals. In several European countries, pharmacists still dominate the field of clinical chemistry.[21] There are impressive data about the amount of analyses done by German hospital pharmacists in the early twentieth century. In 1929, hospital pharmacists in Hannover, Germany, analysed 789 drugs and performed 9232 clinical assays of all kinds of body fluid samples.[22] They also carried out forensic analysis. The hospital laboratory run by pharmacist Dr Philipp Fischer in Nuremberg, Germany, analysed urine, blood, stool and cerebrospinal fluid as well. Between 1910 and 1913 this hospital pharmacy doubled the amount of analyses, until in 1925 they increased the amount six times, with great benefit for the patients. In 89 cases, intoxication with arsenic, lead, morphine, mercury, or barbituric acid could be diagnosed relying on laboratory work done in the pharmacy.[23]

One of the reasons for founding a hospital pharmacy in Frankfurt, Germany, in 1899 was that the physicians wanted to have an inhouse clinical laboratory. Consequently, a formal instruction obliged the pharmaceutical staff to carry out all the laboratory work at the physicians' demand.[24] Today, clinical services like Therapeutic Drug Monitoring (TDM) continue this tradition. In 1990, pharmacists offered TDM or similar services in almost half of American hospitals and this figure is steadily increasing.[25] In all these cases, a pharmaceutical service supports the doctor in diagnosis and therapy. This is the basis for a fruitful cooperation though one might argue that it is a traditional role.

Joint publications

Up to the 18th century, pharmaceutical literature was almost all written by physicians. But then, step by step, physicians and pharmacists worked as co-authors and editors. Today, the vocational expertise of the two health professionals is reflected in many textbooks and reference sources.

As expected, in most cases pharmacists contributed physical and chemical characteristics, assay procedures and analytical data on drug substances. Information about therapeutic use, side-effects etc. came from the doctor's side. In this context, the most important example is *The Extra Pharmacopoeia*, an exceptional tool in drug information. It is now in its 33rd edition and still aims to provide a concise summary of the properties, actions and uses of drugs and medicines, mainly for use by the pharmacist and by the medical practitioner. Its title recently changed to *Martindale: The Complete Drug Reference*. Although the book is now commonly known under the name of the British pharmacist William Martindale (1840-1902),[26-28] it should be mentioned that the paragraphs dealing with the therapeutic use of drugs were initially written by a physician named Wynn Westcott (1848-1925).[29, 30] There is no doubt that the tremendous success of this book was based on the synergy of a medical and a pharmaceutical writer. Martindale himself pointed out that 'a more harmonious co-operation of medical practitioners and pharmacists is necessary if they and we are to be of service to the public in the way which I consider our mutual positions would indicate'.[31]

Similar joint publications are known from late 19th century Germany. Pharmacist Carl Eduard Simon and physician Louis Posner edited a book which, like *Martindale* in Britain, listed drugs with their physicochemical data as well as their medical use.[32] From the seventh edition Posner was replaced by Dr. Luis Waldenburg, a physician and assistant professor at Berlin university. Another volume was edited by pharmacist Schmidt in collaboration with Dr Stöcker.[33]

In nineteenth century America, a journal for both professions named *The physician and pharmaceutist* was even founded in 1868 in New York.[34]

Therapy guidelines

Many examples of fruitful co-working of pharmacists and physicians can be found in hospitals, where therapeutic and economic considerations lead to hospital formularies and guidelines. Particularly in the hospital environment, pharmacoeconomic considerations were always vital. To cope with economic problems, many hospitals edited their own formularies.[35,36] They were usually compiled by physicians under the auspices of the respective administrative authorities, but hints of considerable contributions by pharmacists can be found. For example, Conrad Stich, chief pharmacist in St. Jakob Hospital, Leipzig, Germany, wrote in his auto-biography, that **he** had compiled the formulary in close cooperation with the department of internal medicine.[37] Others contributed price calculations to the book or were involved in clinical studies of drug substitutes.

Rivalry

Analysing the physician–pharmacist relationship one must not neglect historical circumstances where cooperation did not work well. David Cowen described pharmacy and medicine in an 'uneasy' relationship stating that

> throughout the entire eight centuries of the relationship between the professions the matter of ethics and etiquette was too often set aside when questions of economics, prestige, or encroachment were involved.[38]

He again refers to the subordinate role of the pharmaceutical profession from the beginning of its existence. History reveals many examples where mutual rivalry manifested itself in rather offensive statements. Thus, Cornelius Agrippa (1486–1535)

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called the pharmacist 'the physician's cook'. In 1553 a pamphlet was published entitled *Declaration of the abuses and deceits of the apothecaries* which was four years later answered by *Declaration of the abuses and ignorances of physicians*. In turn, apothecaries were accused of being 'long-gowned, wraith-thin and stinking of urine', obviously referring to their involvement in clinical chemistry.

Mutual gifts, particularly at the end of the year, are another completely different aspect of the professional relationship.[58] There are several decrees from the 18th and 19th centuries prohibiting gifts of considerable value showing that attempts at corruption could not have been completely neglected.

Indeed, there are many situations described in the literature which were characterised by (financial) rivalry and envy. Those situations are often closely connected with either pharmaceutical attempts to treat patients or with drug distribution by physicians or their organisations. Whereas in many countries, the responsibilities were strictly separated by law in the late Middle ages, countless historical examples can be found for their violation. This rivalry has been accompanied by friction and antipathy. Tremendous efforts had to be made by professional organisations to keep their members in line. For example, in 1852, the code of ethics of the American Pharmaceutical Association stated that 'the practice of pharmacy is quite distinct from the practice of medicine' and deplored 'the conduction of the business of both professions by the same individual' for it would lead to 'pecuniary temptations which are often not compatible with a conscientious discharge of duty'.[39]

However, in the 1960s the American code of ethics still made discussion of medicines by pharmacists nearly impossible:

> The pharmacist does not discuss the therapeutic effects or composition of a prescription with a patient. When such questions are asked, he suggests that the qualified practitioner is the proper person with whom such matters should be discussed.

According to Cowen, professional relationships began to improve during the 20th century, based on the increased scientific approach chosen by the pharmacy profession. Pharmacists were now academically educated and no longer worked like craftsmen just filling medical prescriptions. They started to take over professional responsibility for therapy and consulting. One of the pioneers in this respect, Eugene V. White from Berryville, Virginia, opposed the code of ethics valid that time and officially applied to change his store's name from 'White's Pharmacy' to 'Eugene V. White, Pharmacist'. He saw consulting patients about their drug usage and problems as his first task and so refurnished his pharmacy completely.[59] He thereby became one of the first pharmacists realising the 'clinical pharmacy' and 'pharmaceutical care' concept, which today is one of the cornerstones in a well balanced pharmacist–physician–patient triangle.[60]

Drug information

Until the end of the nineteenth century, all medicines were prescribed individually and dispensed separately for each patient. Therefore, any drug-related question was naturally discussed between the prescribing physician and the compounding pharmacist. These were the only persons who know about the individual prescription. Since the pharmaceutical industry took over the manufacturing task from the individual pharmacist a gap appeared between the health professions. An anonymous industrial company replaced the pharmacist as the primary information source on the medicines prescribed. Nevertheless, the need for drug information persisted, one reason why industry began to send out myriads of representatives. The kind of information given by these persons, however, has been strongly influenced by advertising and marketing considerations. It is obvious that the company representative is not an ideal cooperation partner for the prescribing physician. In the 1960s, this gap was recognised by the majority of hospital pharmacists and they started to build up independent drug information centers thereby reopening the opportunity for health professionals to discuss prescriptions.[61] The first American drug information centre run by a pharmacist was started 1962 in Lexington, Kentucky.[40,41] During the following decade, drug information proved to be another cornerstone of the clinical pharmacy movement,[42] characterised by a dramatic improvement in the physician–pharmacist relationship.

Education

Examples indicate that in the late nineteenth and twentieth century interdisciplinary education was seen as a way to improve the knowledge and skills as well as a better understanding for young professionals.

In Frankfurt, Germany, the first hospital pharmacy was founded in 1899. A written instruction defined the tasks and responsibilities of the chief hospital pharmacist.[43] He was obliged to offer taught courses for medical doctors. The main aim was to improve the doctors' knowledge about drugs, drug use and pharmacology in order to implement more effective prescribing.

In the United States as well as Europe medical doctors made significant contributions to pharmaceutical education.[44,45] Often the professorship of materia medica and pharmacy was held by doctors of medicine. From the fifteenth to the eighteenth century pharmacists who attended European universities in fact studied medicine. In the beginning of the nineteenth century the pharmacist finally developed from an empiric technician to a scientifically educated professional. With the progress of pharmacy towards an academic discipline, the need for specialisation in pharmaceutical sciences occurred. Therefore, the M.D. could not proceed in his traditional role as a universal teacher. The specialisation process resulted in the separation of medical and pharmaceutical education. Georg Urdang commented on this in 1950:[46]

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> Does all this mean a loosing of the connection between [...] pharmacy and medicine? The development up to date has given proof of the contrary. Modern drug therapy asks for specialists in both fields, pharmacy as well as medicine, the one supplementing the other and both doing teamwork in research as well as in practice, be it in industry, school, or professional service to the general public. There is no room for overlapping activities anymore. All that is required is mutual understanding of the language, the problems, and the scope of knowledge of the sister profession.

As pharmacology developed as a major component of both medical and pharmaceutical education in the mid twentieth century, the room for overlapping education has grown once more. Today, professional interaction and communication between physicians and pharmacists is seen as a vital part of education and training.[47,48]

Understanding medical language was one of the keys for pharmacist's interventions in drug therapy in the United States. The promoters of a specialisation in hospital pharmacy, Harvey Whitney and Donald Francke, were well aware that additional qualification for pharmacists should cover these topics. When Whitney implemented the first hospital pharmacy internship in 1927 in Ann Arbor, Michigan, medical terminology, drug information, and active participation in staff meetings were among the essential content of the program.[62] He also encouraged his students to participate at autopsies.

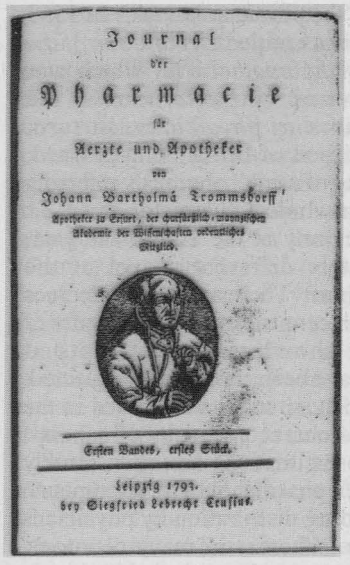
In 1947 a comprehensive list of subjects for the first graduate program was published.[63] Again, we find several headings that indicate the links between pharmacy and medicine in this program.[64] In particular, drug information was one of the most important aspects for Donald Francke:

> The Drug Information Specialist is concerned with the retrieval and evaluation of drug literature and its communication to members of the health care team. There appear to be two types of drug information specialists, the one predominantly systems-oriented and the other predominantly clinically-oriented. It would be well to have minimum knowledge in each area established in order to produce a well-rounded specialist.

Continuing education

Over the centuries, interdisciplinary continuing education was seen as a good opportunity to strengthen the bonds between the health professions. Significant activities can be found in hospitals, community pharmacies and universities.[49] In the above-mentioned Frankfurt hospital the pharmacy head, Dr Ernst Richter, not only gave lectures but promoted questions and discussions. He proposed that interdisciplinary continuing education should be compulsory.[50]

An example of continuing education in community pharmacy was described in 1826 by the scientifically oriented community pharmacist Dr Ludwig Bley. In a letter to his father-in-law, Johann Bartholomäus Trommsdorff, he mentioned a discussion and lecture group of all the doctors and pharmacists in his town. The aim of the group meetings was to read scientific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für
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Akademie der Wissenschaften ordentliches
Mitglied.
Ersten Bandes, erstes Stück.
Leipzig 1793.
bey Siegfried Lebrecht Crusius.

journals and discuss the results and opinions.[51] In Germany at present, such discussion groups have been started by the professional bodies of physicians and pharmacists to revitalise local communication between the health professions.[52] Discussion focused not only on medical and pharmaceutical but also on pharmacoeconomic aspects.

Furthermore, pharmacist–physician cooperation was popular in the 1930s and seen as a good opportunity to improve knowledge of the sister profession. Theoretical and practical input was given by universities and pharmacies. The University of Hamburg was engaged in a project that focused on herbal remedies.[53] The compounding of ointments and other preparations was demonstrated. Some doctors even worked as interns in community pharmacies.[54]

Conclusions

Despite the history of conflict between pharmacy and medicine, many examples of a brotherly rather than hostile relation can be found.[65] Throughout the centuries, problems mostly occurred when matters of economics and prestige seduced the two health professions into exceeding their own vocational competence. On the other hand, cooperation worked particularly well when pharmacists and physicians were in close contact during the therapeutic decision process or were involved in the development of therapeutic guidelines. Provision of pharmaceutical services, for example clinical chemistry and drug information, that were useful for therapeutic decisions, promoted teamwork in many cases. Furthermore, the payment of pharmacists for drug distribution as well as for pharmaceutical services helped to improve the cooperation.

Today, the goal of medicinal therapy is to improve patients' health and quality of life. Pharmacists and physicians have complementary and supportive responsibilities in achieving this goal. This requires respect and communication as well as trust and mutual recognition of each other's professional competence.

The historical examples indicate that cooperation is improved by a better understanding and acceptance of the respective vocational responsibilities. Pharmacists should offer essential services for therapeutic decisions. Interdisciplinary continuing education can encourage the mutual recognition of physicians and pharmacists.

However, pharmacists are no longer eye-witnesses of the drug prescribing process as they had been

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centuries ago. Today, new communication technologies such as the internet or videophone can be used to overcome this historical gap. Further links between all health professionals should be implemented in order to facilitate a corresponding therapeutic decision making process. This should be the challenge for the 21st century in terms of a better quality of life for all patients.

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This paper was given at the BSHP Conference 2002 at Cardiff.

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The 1857 Inventory of Materia Medica of the British Hospital in Jerusalem

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Introduction

The sanitary conditions in the Levant at the beginning of the 19th century were extremely inferior, resulting mainly from overcrowded and unventilated quarters, excessive garbage deposits, sewage flowing through the streets, disregard for personal hygiene, and water drawn from untreated wells. These harsh conditions caused infectious diseases and epidemics which claimed many victims. Among the diseases that most frequently afflicted the inhabitants were malaria, eye infection, headache and dysentery, as well as other infectious maladies and contagious childhood illnesses. Among the epidemics noted were cholera, bubonic plague, typhoid fever , smallpox and meningitis.[1]

In the course of time, a variety of popular folk remedies were developed, based on old medical treatises and on medicinal substances in use since ancient times. Alongside these were remedies, cures, charms, amulets, incantations and superstitious beliefs. These curative methods were often applied with the assistance of minor religious functionaries of all three faiths (Christian, Jewish and Moslem) reciting passages from their scriptures and sending their flock of worshippers to prostrate themselves on the graves of saints buried in the Holy Land.

In Jerusalem, as in other cities of the Ottoman Empire, there were minimal medical services, meant to supply the needs of the general population without distinction of religion or nationality. But by the nature of things only the Arab population benefited from these services. The general public hospital in Jerusalem, which functioned throughout the Ottoman period, was the continuation of the medical institution dating from the period of the Ayyubid caliphate of the 12th and 13th centuries, and it belonged to the charitable endowment trust named for the donor. The standard of this institution, as of other similar institutions, fell to the same low level to which the Ottoman Empire itself was gradually descending.[2]

The residents of Jerusalem were therefore obliged to make do with the medicinal substances which had been in use throughout the region for centuries. As time passed, the variety of medications decreased because of disruptions in the trade routes. The harsh economic conditions suspended the demand for exotic and expensive substances, and there was a lowering of standards among physicians and caregivers.[3] Among the scores of substances mentioned in the various historical sources concerning the medical situation in Jerusalem until the beginning of the 19th century, only quinine is listed as a medicinal compound introduced from the new world. This medication was prescribed in the dispensaries of the Franciscan community in Jerusalem during the first half of the 18th century.[4]

In that same century, new substances from Africa, Asia, and America became important components in the reservoir of medications, as testified in the volumes of .materia medica.[5] Most of the materials traded in Palestine for use by authorised physicians are definable as traditional medicinal substances. As indicated by their plant, mineral and animal origins, during the period under discussion these were derived mostly from local sources.[6]

Key testimony to the medical conditions of Jerusalem during the 19th century is found in the writings of the Swiss physician Dr. Titus Tobler.[7] He made four visits to Jerusalem (1835, 1845-6, 1857, 1865), each of which yielded articles and books reporting his researches and his intellectual experiences. The importance of his legacy is particularly in his contributions to our knowledge of Jerusalem in the 19th century.[8]

In 1853 Tobler published his book *Denkblatter aus Jerusalem* (Recollections of Jerusalem), which was based on his last visit to the city.[9] One chapter of the book gives a detailed description of the local medical institutions in Jerusalem at the time, together with

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an account of the establishment of the modern medical institutes. Two years after his second and longest visit he wrote *Beitrage zur Medizinischen Topographie von Jerusalem* (a description of medical conditions in Jerusalem).[10] This volume draws a unique picture of that aspect of life, one almost totally neglected by the majority of descriptions of the Holy Land written during the 19th century , which numbered in the thousands.

According to Tobler's observations, there were four European pharmacies functioning in Jerusalem in 1846. The Franciscan pharmacy, the best known in the city, was located in the Franciscan monastery. Being the longest extant European pharmacy in Jerusalem, it was highly thought of through the ages. Tobler wrote in his notebook, after visiting the pharmacy in 1835:

> The place looks ancient ... the laboratory is strange, unmatched by any European competitor for being so strange ... the instruments have old-fashioned shapes, like the traditional tools of mystic alchemy and astrology... Together with those instruments were some skeletons, surgical instruments, threatening monsters covered with mould ... different types of amulets ... and all in ancient dark rooms. Yet the store room of the medicinal substances was exceptionally fine.

The Greek Orthodox pharmacy, according to Tobler, was

> The cleanest of all, it was bright and well designed. The names of medicines were written in magnificent Greek lettering. The Greek Orthodox inhabitants and pilgrims received the medication free of charge.[11]

The Jewish pharmacy was located in Dr. Shimon Frenkel's house. Frenkel, a Jewish physician of German origin, was sent in 1843 by Sir Moses Montefiore, the Jewish philanthropist, to establish a Jewish hospital in the holy city.[12] Tobler recalled some medicine sellers whose 'pharmacies' were in the Jewish quarter and were better equipped than those of the Arab drug sellers. Two of these were 'of importance; the names of the medicines were written in Hebrew and cleanliness was non-existent'. Tobler added that he found there the 'Kalomel' and opium decoction that he could not find in the Arab drug market. He also found theriac and other materials. Tobler concluded this subject: 'Other than at the Christian pharmacies, physicians could find the most essential substances here, as long as they could read the drug's [Hebrew] name'.[13]

The English pharmacy, located in their hospital, will be discussed later. Tobler gives an exceptional account of a visit to *Suk al-Attarin,* the drug market of Jerusalem in the northwest of the city. He made a list of the substances he saw in one shop, which in the event proved to be, as far as we know, the only list of medicinal substances ever compiled or published in the entire history of Jerusalem until the present. It was written as a distorted transliteration in German script of the Arabic names, and it has subsequently been translated and studied. It contains 81 substances and is similar to lists drawn up in the same market in the last few years.[14]

The British Missionary Society and its Medical Activities

Britain showed very little interest in Palestine during the 19th century .In those days it was of lesser importance for the British Empire to take over Palestine and to precipitate the demise of the 'Sick Man on the Bosphorus' (as the Ottoman Emperor, ruler of Palestine, was then called), than to take the necessary steps to prevent other powers from carrying out any actions that might jeopardise British interests in the East. The underlying interest of Protestant England was not the holy sites in Palestine but the idea of the 'Restoration of the Jews'. The main tenets of faith that had taken hold among the Protestants told of the imminent Second Coming of Christ, and that his advent would herald the utopian epoch of the Millennium. An important factor in this body of faith and a condition for the fulfilment of this apocalyptic vision was the return of the Jews to the land of their fathers and their immediate conversion, or alternatively their recognition of the Messianic claims of the Christian Saviour. On the basis of this belief, many missionary societies were formed around the world with the aim of spreading the Christian gospel among the Jews. The most prominent was the London Society for Promoting Christianity amongst the Jews (LJS), founded in May 1809 by Christian Friedrich Frey, a German converted Jew.[15] The London Society grew at an extraordinary rate, extending its arms into the central cities of Europe, maintaining a foothold in Palestine and for a while turning its Jerusalem outpost into the centre of Protestant operations in the Holy Land. In March 1841 the heads of the society decided to execute their old plans for founding a hospital for the Jews in Palestine and next to it 'a School [is to] be established in Jerusalem under the immediate direction and management of the Head of the Medical department, and in which Surgery and Pharmacology is to be taught'. Dr Edward Macgowan, who was nominated as head of the medical department,[16] arrived in Jerusalem in January 1842. At the end of his first month of work he sent a detailed report describing the poor state of health of the Jerusalem Jews, his activities among them, and his recommendations for the construction of a hospital and dispensary. He urged the London Committee to hasten the construction enterprise and hinted that it would be possible to economize on the expenses of the medical department by growing medicinal herbs. Macgowan even exhorted the society to let him lease some land for this purpose and to employ a local worker. While still awaiting permission from London, he began to renovate a small building for use as a dispensary to render first aid to Jewish patients and as a centre for the sale of medicines.[17] On December 12, 1844 the Jews' Hospital in Jerusalem was opened, and within days was full to capacity.

In the mid-1870s the need for a new hospital in Palestine arose because of the dilapidated state of the old hospital building and the increasing rate of occupancy in that period, but it took the society 25

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more years and only on April 13, 1897 was dedicated the new hospital for the Jews in Jerusalem, the flagship of the London society in Palestine and the institution in which most of the funds and attention were invested.[18]

The Materia Medica Inventory of the British Hospital in Jerusalem in 1857 as a Key Historical Source

Clinics and hospitals in lands distant from England and in underdeveloped countries were not a unique or exceptional phenomenon in the 19th century. As a colonial power, Britain provided advanced medical services for its citizens who were stationed as government officials, military personnel or merchant traders in every corner of the globe. As proof of this, the medical press in England ran regular features on British medical activities around the world, advertisements to enlist physicians and pharmacists for medical work in the colonies, and even reports on military medical systems in the world. Detailed and accurate reports were part of the culture of governing which made the existence of a colonial empire possible. This remained an ingrained feature of British colonial practice for centuries and the medical staff serving in the Jerusalem hospitals acted accordingly. Although the hospital functioned as a non-governmental institution belonging to a philanthropic organisation, strict regulations regarding the keeping of records and drawing up of reports were observed.

The medical activities of the London Jews Society in Jerusalem are recorded in its rich archives deposited in the Bodleian Library at Oxford. There we drew on many documents relating to medical activities in the society's hospitals in Palestine, including medical reports, plans for the construction of medical institutions, personnel matters and publications concerning these institutions, as well as extensive correspondence for data. This paper presents one document out of the LJS archival collection that throws light upon the medical methods practised in the early period of the hospital. It is an inventory of medications in the store of the dispensary at the Jerusalem hospital, dated 1857. It lists 266 items on nine pages in partially legible handwriting and is entitled 'List of Medicinal Preparations Found in Store and Dispensary on July 21, 1857'.[19] A portion of the last page is shown in Figure 1 and Table 1 summarises its composition.

Data Analysis

Analysis reveals the sources of the drugs and preparations (Table 2). Special attention should be paid, over and above all the other materials, to the ether [Atheris rectificata] and chloroform, both found in the last group of materials in Table 1 (Athers and Spirits) and in Figure 1. Their presence might be

Table 1. Medicinal Substances in the British Hospital, Jerusalem 1857

Type of Product	Number
Oils	29
Liquid preparations	9
Acids	16
Alkalis and salts	23
Metallic salts	46
Alkaloidal salts	13
Gums	11
Extracts	23
Pills	2
Ointments	8
Powders	42
Roots, barks, leaves	31
Ethers and spirits	13
Total	266

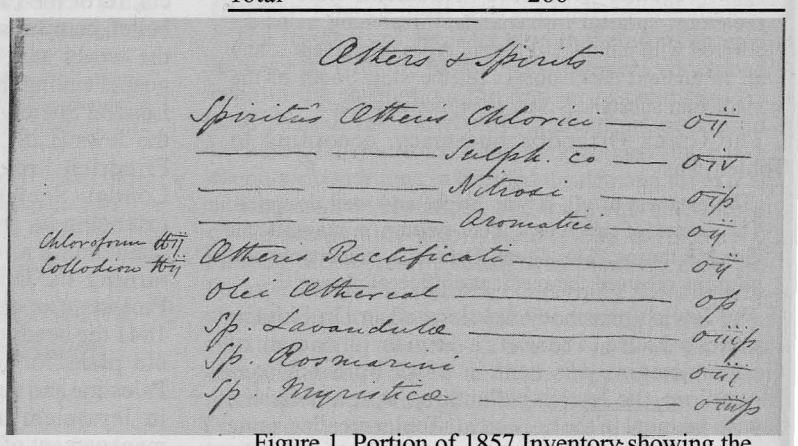

Figure 1. Portion of 1857 Inventory showing the 'Athers' and Spirits

strong evidence for the first application of modern techniques of anaesthesia in the Holy Land. Until 1999 it might have been considered evidence of the first surgical use of chloroform in the Ottoman Empire, since previously the first known use was in 1864, but lately new chronological research into the annual reports of the Galatasaray Medical School in Istanbul revealed that the first surgical use of chloroform in the Ottoman Empire was actually at the Imperial Medicine School at Galtasaray in 1848.[20]

Table 2. Composition of the 1857 list of medicinal preparations

Source	Number of substances	Percentage
Plants	157	59.0
Chemicals and minerals	104	39.1
Animals	5	1.9
Total	266	100

Comparisons with other lists

A comparative examination showed that the list

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contains a quarter of the materia medica known and applied in that period in England,[21] and altogether about a third of the items in the *British Pharmacopoeia* of 1858, which contained 734 medicines.[22] Similarly, a comparison of the list with the standard inventory of clinics in 19th century England shows that the stores of the hospital and clinic in Jerusalem contained about 80% of the substances used at that time.[23] Most of the raw materials for preparing the medicines were imported from England, including those found in abundance in Palestine, both in the open fields and in the city markets. Among the substances derived from plants were several originating in Asia, mainly in India (Cajuput), Africa (Kino), and the Americas (Cinchona, Ipecacuanha, Sassafras). The use of substances from the New World was a characteristic of modern medicine, and the only evidence of such substances present in the Levant at the time is of quinine, used by the Franciscan monks in Jerusalem as early as the 18th century.[24] The only animal substances located in this list are cod liver oil, cetaceum (spermaceti), sperm oil, Spanish fly (cantharides - for blistering and as an aphrodisiac), lard and animal charcoal. These substances were widely used in the past as medications and are prevalent today in traditional medicine practised throughout the Middle East. For comparison, note that in that region during the Middle Ages the use of substances from 30 different kinds of animals has been recorded in the framework of scholarly medicine.[25]

Many of the substances found in the list could have been obtained in the Jerusalem marketplace. For example, cinnamon, nutmeg, pepper, camphor, aloe vera, sulphur, gall-nut, lead, iron, zinc, gum-arabic, galbanum, pine resin, soap, myrrh, rhubarb, cardamom and galanga. Also listed were substances that could be found plentifully both in nature and in Palestinian agriculture, such as castor oil, almond, water melon, bitter apple, bindweed, liquorice, pistachio, squill and laburnum.

Additional plants appearing in the list could easily have been grown in the garden of the British hospital in Jerusalem: rosemary, lavender, basil, anise, and saffron. The founder of the hospital, Dr Edward Macgowan, made a proposal on this matter in February 1842. In his efforts to establish the hospital, he urged the LJS leaders to allow him to lease a plot of land and to employ a local worker to cultivate a garden adjoining the institution. Thus, 'it would be possible for the Medical Department to save expenses by growing medicinal plants.[26] However, even if the hospital staff were to raise these plants in their garden, or collect them from the open fields, there would still be the need to extract the oils, to produce the powders, to collect the resinous juices and so on. Such processes need professional skills, expensive training and reliable workers over a prolonged period of time. The medical staff undoubtedly preferred to purchase the oils, essences and powders in England, where these substances were produced in mass quantities by industrial processes and were of high quality at that time.

The reasons against purchasing these products in England might be the distance between Jerusalem hospital and London, the methods of transport, and the risk thus incurred to the medicinal substances and medications. A consignment took several weeks to arrive by ship from England, and after arrival it was transported from the port of Jaffa to Jerusalem by mule caravans. Another possible explanation could have been the financial situation of LJS, which enabled it to purchase only the primary basic substances. The traditional substances in the medical stores of the British Hospital in Jerusalem, constituting more than half of the listed items, were apparently a significant factor in the inventory, of substances, so their medical importance was therefore relatively high. These substances seem gradually to have disappeared, and are hardly mentioned in the pharmacological framework of conventional medicine. However, they did not disappear entirely and some of them were to occupy a major place in the stores of alternative medicine, which is very popular today among the sick and ailing.

Comparison of the Inventory of the Hospital in 1857 with Tobler's Description of Pharmacy and Traditional Materia Medica in Jerusalem in 1845

A comparison of the inventory listing with the list of popular medicinal substances drawn up, as described above, by Tobler after his visit to Jerusalem in 1845, also proves that the substances in the Jerusalem markets and in the city dispensaries, such as the Jewish, Greek and Franciscan dispensaries, could have been of help to the British Hospital in time of need (Table 3). Among the 57 substances of plant origin we find herbs such as rosemary and chamomile, and spices such as cinnamon, ginger and clove. The list also contained resins and gums such as tragacanth, sarcocolla and myrrh, roots such as spikenard, rhubarb, sweet-violet, seeds and fruits such as myrobalan and bitter-vetch and different oils: black pepper oil, caraway oil, nutmeg oil and many others.

Table 3. Composition of Tobler's List of Medicinal Materials

Origin/ Source	Number of substances	Percentage
Plants	57	70.4
Minerals	9	11.1
Animals	8	9.9
Other	7	8.6
Total	81	100

As for minerals, Tobler describes nine in his list, most of which were different kinds of salts such as borax, English salt and tartar; pure minerals such as sulphur and other substances of mineral origin such as the 'armenische Bolus' (Armenian bole).[27] Of the eight substances of animal origin described by Tobler, two were derived from the beaver: *Bibergeil* (beaver gland) and the Arabic term *Dehen el-Mannasar* (oil of beaver gland).[28] Tobler added that 'One of the most unique substances was the 'Mumie' (local name);

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the inhabitants believed it has an exceptional curing power'.[29] This material was the remains of bodies, mainly of Egyptian mummies, which was sold in the markets of Jerusalem.[30] The mummies were used by members of all faiths to cure people who were dying, and the material may still be purchased at one shop in the Old City of Jerusalem.

Tobler added that he heard about the oil of the 'Zaqum', which according to him cured 'wounds within days'. 'A Venetian traveller who fell off his horse felt a worrying ache in chest, rubbed his body with 'Zaqum' oil and drank some, and within some days the wound was scarred over and the internal aches were eased'.[31] *Zaqum* is the Arabic and Hebrew name for Egyptian balsam (*Balanites aegyptiaca*), a tropical tree that grows wild in the Judean desert, in the Eastern part of Israel. The oil pressed out of its fruit has been used as a medicine since early history.[32] Tobler also mentioned the frequent use of 'Theriak',[33] which is a mixture of many medicinal substances: plants, poisonous minerals and extracts of generally poisonous animals, such as snakes and scorpions.[34] The manufacturing process for Theriac was a well-kept secret throughout history. Medieval Muslim medicine made use of a different kind of Theriac such as the Jerusalem Theriac which was famous for its medicinal qualities and was even exported to other countries.[35]

Comparison of the Inventory of the Hospital in 1857 with the Unwritten Materia Medica of the Medieval and Early Ottoman Levant (640-1799)

Comparison of Table 2 with the inventory of medicinal substances in the al-Sham region (i.e. Levant: Israel and parts of Syria, Lebanon and Jordan today) during the medieval and early Ottoman period was made and the composition of the lists was found to be similar (Table 4). Comparison between the 1857 listing and

Table 4. Medicinal Substances used in the Levant during the Medieval and Early Ottoman Period

Origin	Number	Percentage
Plants	234	81.8
Animals	27	9.5
Minerals	15	5.2
Others	10	3.5
Total	286	100

the historical inventory of medicinal substances in the lengthy time-span from the Muslim conquest in the 7th century to Napoleon's campaign at the end of the 18th century shows a decline in the number of plants used as a basis for medications from 234 to 157 (plants were often used as sources of chemical compounds) and in the number of animal-based products from 30 to 5. In the 1857 listing, 104 chemicals and minerals were used – a new and significant factor in the inventory of medicines. These in fact replaced the minerals used in the medicines of earlier periods until the Middle Ages and generally constituted 5-10% of the general inventory.[36] This comparison of the historical inventory and conventional listings is introduced here for the sole purpose of assessment.

The overwhelming majority of substances that served as simple drugs or as a basis for complex drugs derives from plants. The proportion of materials derived from animals and animal organs is small. Minerals represent only a small proportion of our list, either because of their relatively small number in nature, or because great caution was exercised in the application of minerals and chemical substances uncommon in daily use. Considered from a comparative perspective, these statistics resemble the distribution of substances found in lists of medicinal substances from different periods and cultures.[37]

A botanical analysis revealed plant species whose medicinal use in the region was previously uncertain or unknown. These plants include: common agrimony (*Agrimonia eupatoria*), deer balls (*Lycoperdon* sp.), Christmas rose (*Helleborus* sp.), common gromwell (*Lithospermum officinale*), gardenia (*Gardenia* sp.), Job's tears (*Coix lachryma-jobi*), Solomon's seal (*Polygonatum officinale*), common yew (*Taxus baccata*), dodder (*Cuscuta* sp.), great snapdragon (*Antirrhinum malus*), squirting cucumber (*Momordica balsamina*), small caltrops (*Tribulus terrestris*), great horsetail (*Equisetum telmateia*) and the drias plant (*Thapasia gargenica*).

Several plants traced in the historical sources were used in keeping with an ancient medical theory — called in the late Middle Ages the 'Doctrine of Signatures', (a theory that asserts that the way plants, animals and minerals look, feel, taste or react suggests their medicinal application). Plants such as: lemon balm (*Melissa officinalis*), coral peony (*Paeonia* sp.), tanning sumach (*Rhus coriaria*), corn gromwell (*Lithospermum officinale*), great snapdragon, horned poppy (*Glaucium corniculatum*), spiny broom (*Calicotome villosa*), southern maidenhair fern (*Adiantum capillus-veneris*) and wild dog rose (*Rosa canina*) were used to treat symptoms and diseases which were similar in colour, shape or effects.[38] The animals traced in the historical sources can be divided into groups according to their availability:[39]

1. Domesticated animals such as cattle *(Bos taurus)* and chickens (*Gallus galus domesticus*), pests such as lice (*Pediculus* sp.) and stinking bug (*Cimex lectularius*), and others such as the earthworm (*Lumbricus* sp.) and the firefly (*Lampyris* sp.). The use of these animals, their organs, and products is explained by their immediate availability, which made possible fresh supplies at low cost.

2. Wild animals such as the poisonous snake adder (*Echis coloratus*), the amphibious triton (*Titurus vittatus*) and the common beaver (*Castor fiber*).

3. Exotic animal species such as musk (*Moschus moschiferus*) and coral (*Coralium rubrum*).

Seventeen substances of mineral origin have been traced in the medieval and early Ottoman historical sources. One of the conclusions drawn is that most of these medicinal substances were mined and produced in the Levant. The majority of such substances were geologically related to the Red Sea Rift in the southern part of Israel, while the remainder was found primarily in the northern part of the country.

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Summary and Conclusions

The medical services of the London Jews Society in 19th century Palestine, in comparison with the level of medicine conducted decades earlier by the Ottoman medical system, and even by the Franciscan medical institution, is instructive. It shows that the British started a new era, that of modern medicine. One of the best pieces of historical evidence of the turning point in the medical history of Palestine is a list compiled in July 1857 of medicinal substances stored in the hospital dispensary in Jerusalem. The document is one of the first written testimonies of modern medical and pharmacological activity in the Levant in general and Palestine in particular. For millennia the lists of medicinal substances which were used by humans contained a fixed proportion of substances according to their origin (plants, minerals and animals). The composition of the 1857 list testifies above all to the increasing use of various chemicals as medicines or as components together with plants, minerals and animal substances. The growing use of chemicals and minerals was at the expense of substances derived from animals and of other indefinite origin, which had been more prevalent in the past. The presence of chloroform and ether in the list might be strong evidence for the first application in the Holy land of modern techniques of anaesthesia.

Acknowledgment

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Drug Jars and the Colour Blue

Dr J. Burnby

Analyses of blue glass made by the ancients show that the earliest specimens were coloured sometimes with cobalt, but much more frequently with copper. Of the many pieces of dark blue glass found in Tutankhamun's tomb, only one specimen was found to contain cobalt, and the same was the case in finds from Nippur in Mesopotamia.[1] These cases are now thought to have been purely accidental.

In the late 1400s an apparently useless mineral was found in the mines of the Erzgebirge lying between the present day Czech Republic and Germany, but in about 1545 a Christoph Schuerer discovered that these ores could impart a deep blue to glass. Caskfuls of the roasted ore were soon exported to the Netherlands where it was widely used in the manufacture of delftware pottery. It was not long before Elector Johann Georg of Saxony was instrumental in developing an extensive cobalt industry.[2] To understand how all this came about, one has to know something of the history of this pottery and how it was made.

The origins of this particular earthenware are in the Middle East in countries such as Persia and Iraq. The Moors (as they were then termed) were well established in Spain by 747 AD, and by the 10th and 11th centuries had a high degree of civilisation.

The works of the Arab mathematicians, for example, and the Arab translations of Euclid, Archimedes etc., were read and commented upon in the three great Moorish schools of Granada, Cordoba and Seville. All knowledge however was jealously guarded from the Christians.[3] It was an English monk, Adelard of Bath, disguised as a Mohammedan student who went to Cordoba in about 1120 and there obtained Euclid's *Elements*. It was translated into Latin to become the foundation of all editions in western Europe until 1533 when the Greek text was recovered.[4] Certainly before the end of the 13th century, Roger Bacon was familiar with it.[5]

This tin-glazed pottery was certainly known in Moorish Spain and from there it passed to Renaissance Italy. The Balearic Islands were then involved in the carrying trade and used to bring this magnificently decorated pottery from Spain to Italy. There it gained the name of 'maiolica ware' and when it passed into France it was called 'faience'.

Tin-glazed pottery

An article on the Pickleherring Potteries relates that the mix of clay used was of importance in the making of delftware.[6] The clay used there was about eight parts of white clay from Norfolk or Suffolk, five parts of blue clay and three of red clay, both of which are found abundantly in the London area. The earthenware was made into the desired object and allowed to dry until it was leather-hard, after which it was fired in a kiln at about 950-1050°C and now was said to be in the 'biscuit' state with an opaque, absorbent white surface on which painting could take place. This coating consisted of silica obtained from white sand, flint or glass, a metallic alkali such as potash, together with a mixture of three parts of lead oxide to one part of tin oxide. It was the addition of the tin oxide which was so important because it gave the white, absorbent surface for the later painting.[7]

A second coat of glaze is given after the painting, the firing of which then converts the pigments to their final colours, fusing them into the tin glaze and simultaneously a transparent glaze is formed.[8]

Maiolica

The term 'maiolica' was originally applied to wares having a lustre or metallic sheen, but during the 16th century it came to be applied to all tin-glaze earthenware made in Italy, whether lustred or not. Lustring was achieved by applying. silver or copper oxide with sulphur and ochre and firing for a third time in the presence of black smoke, with the consequent reduction of the metallic oxide.[9] The great or classical period for Italian majolica is regarded as being from about 1420 to 1565. It is debatable when tin-glazed pottery first arrived in Italy, but it is possible that it occurred as early as the 13th century.[10]

The palette of colours was somewhat limited, partly because only the metallic oxides could be used, especially in the second firing. Woad, for example, a dye of vegetable origin (well known in England since the days of Caesar we are told) was not suitable. The colours which could be used were: ochre, which ranged from yellow to orange and reddish brown; yellow, which was obtained from antimony; green from copper, one of the earliest colours; manganese, which gave a purple which could vary from almost black to a faint amethyst. The red found on delftware was derived from iron oxide, but if the temperature was too high then it became brown; and above all the blue was obtained from the cobalt oxide contained in 'smalt' and 'zaffire'.[11]

John Stow wrote in his *Survey of the Cities of London and Westminster* that 'about the year 1567, Jasper Andries and Jacob Janson, Potters, came away from Antwerp, to avoid Persecution there, & settled themselves in Norwich, where they followed their Trade, making Gally Paving Tiles and Vessels for Apothecaries ... and Anno 1570 they removed to London ... & desired by petition, from Queen Elizabeth, that they might have Liberty to follow their Trade in that City without Interruption.'[12] This story is well known, but what is less well known is that it was only Jansen who came to London, by which time he had anglicised his name to Jacob Johnson. Having

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gained Queen Elizabeth I's permission to settle in the capital he set up a delftware pottery in Aldgate. There seem to have been a number of pot-makers in that area of Flemish origin.[13] Johnson died in 1597 but his pottery continued working for some twenty years after his death. It is thought that he continued to produce pots in the style of the Netherlands, but this is not easy to prove.

At this point another emigrant, Christian Wilhelm, comes into the history of delftware in this country. He came to England from the Palatinate which lies either close to or on the river Rhine in about 1605. He was a man who could turn his hand to a number of trades as he seems to have been once a vinegar maker and distiller of spirits, but in 1618 turned to making 'galleyware'. In 1628 he asked for permission to make 'blue starch, alias smalt' and to be the 'sole manufacturer of gallyware in England for 14 years'.[14] It seems that the first request was not granted, though the second was.

The term 'galleyware' was certainly used in England until at least the mid eighteenth century. Some believe that as these 'painted pots' were being largely imported in the late Middle Ages into Southampton in Genoese and Venetian ships known as 'galleys' this was how the description came about, while others think it is a corruption of a Dutch word, 'geleypot' which is rather more likely.[15]

Smalt

Indeed, Christian Wilhelm had no claim to the making of smalt for the monopoly was already held by a man called Abraham Baker and it still had many years to run, for it had been granted on 16 February in the 16th year of James I (1618).[16] At the time of this grant, patents or monopolies could run for at least as long as 31 years. This was amended on 25 May 1624 so that in future all monopolies would be valid for only fourteen years with a special exempting clause for Baker. Nevertheless, a note had been added in Thomas Webster's *Reports and Notes of Cases on Letters Patent for Inventions* (1844) that "The first smalt patent 'ante 9' shows that other persons were associated with Baker in the introduction of the invention; nor was the manufacture new within the realm at the time of the grant of the excepted Patent."[17]

Returning to the story of cobalt, the miners of the Harz mountains and in the Erzgebirge of Saxony and the Czech Republic were often disappointed in their efforts to mine copper and other useful minerals in the 14th and 15th centuries because they mistook the identity of the ores they mined, so much so that they believed a Kobalt or evil spirit dwelt in the unwanted ores. One of these ores however was found to be a source of cobalt and to prove highly desirable. The finest 'smalt' of Saxony was monopolised by the government on behalf of the Royal Saxon Porcelain Manufactory at Meissen, close to Dresden.[18] Export was forbidden and there were severe penalties.

Sources of smalt and zaffre

There are two main types of cobalt-containing ores: 'Smaltine' or 'Speiss Cobalt', in which cobalt is found as an arsenide, and 'Cobaltine' or 'Cobalt glance', which forms the bulk of the cobalt ores of commerce. It is a combined arsenide and sulphide of cobalt, CoAsS.

Little has been found in Britain except in Cornwall, a small amount at Alderley Edge, Cheshire and as will be noted later, in Scotland. Zaffre and smalt of commerce were both prepared in different parts of Germany, particularly in the Schneeburg area, which thus gave a very lucrative trade to Saxony.

The origin of the name 'zaffre' is disputed, some saying it is from the German and others from Italian. The cobalt ore is broken into small pieces and spread over the hearth of a furnace. The dense arsenical vapours are driven off into a chimney and condensed for sale. The cobalt ore is roasted at least twice for several hours, and then ground and sieved to give a very fine powder. This powder is then mixed with twice its weight of powdered flint or quartz, wetted and rammed into small barrels, when it soon becomes stony hard. It is then the zaffre of commerce.[19] It is said by some that the addition of flints or quartz was just an attempt to fool the user or buyer, 'Smalt', which is a very deep blue almost black glass, is made from zaffre after further processing. About equal parts of the roasted ore, potash and ground flints are used. After mixing it is then melted in pots like those of the glass houses, where it requires some 10 to 12 hours for complete fusion. It is then ladled out into cold water to crack it all over and ground in a mill made of exceptionally hard stone until it is of flour fineness. Varying degrees of fineness may be obtained by further washing and sifting.[20]

In a letter to Sir Charles Erskine, Andrew Crosbie in April 1759 claimed that 'about £200,000 sterling goes out of Britain annually for that Article of Commerce', as all the cobalt for British potteries and other industries came from Saxony.[21] From 1730 the demand for both zaffre and smalt increased year by year, so that 180,000 lb came to England in 1748 and had increased to 286,000 lb by 1754.[22] Owing to a war between Prussia and Saxony from 1756 to 1763 with a consequent shortage of smalt, the Cornish ores had to be worked, but the quantities were always inadequate.[22]

It was altogether fortunate that at this juncture cobalt was found in a mine at .Alva, near Alloa in Fife on the edge of the Ochill hills. In 1714 a very rich seam of silver had been found there, but it soon petered out. It was milled by Sir John Erskine but he died in 1737 and the estate was sold to a relative who reopened the mine in 1758.[23]

The first mention that the mine was cobalt-bearing occurs in a letter from Joseph Black of Glasgow, one

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of the leading chemists of the period. He wrote on 17 January 1759 that the cobalt was of the type 'that affords the Saffer or blue for porcelaine etc.' and that he would obtain some for testing. The trials proved satisfactory.[23]

Word soon passed around the world of pottery and both the Worcester and Derby centres of porcelain manufacture wrote for samples They proved excellent and requests for quantities up to a hundredweight were made. About this time, Nicholas Crisp a leading light of the (Royal) Society of Arts became involved. This was not surprising as he was one of the few in Britain who had had practical experience of making zaffre and smalt from cobalt ore in Cornwall during the 1750s. In one of his letters, as a postscript, he wrote that 'zaffre in London could command prices of '10s. to 20 shillings per lb according to its goodness. Smalt is from 7d. pr lb to 2sh pr lb in proportion to its goodness.'[24] This gives some idea of the dilution taking place.

A group of ten men decided to form a company in order to exploit the mine and Nicholas Crisp 'adventured' £300 in December 1761. Crisp was not always entirely happy with some of the properties of the zaffre which was being obtained from this cobalt. He wrote in September 1761 that he had observed 'in these ores and in the Zaffre made from them, that they are apt to spread in the fire, not give a clean distinct line ... but a Wooly line'.[24]

He mentions also that the cobalt ore contained 'no inconsiderable quantity' of silver, and suggests the possibility of mining it. He writes as well that for the making of zaffre and smalt, apart from the cobalt ore, 'The first thing necessary ... is a Clean Fusible Sand' and recommends that from the Isle of Wight. He pointed out also the necessity to save and collect all the arsenic and sulphur during the roasting 'not only in point of profit but also to prevent poisoning the Ground, and Air, and killing or at least hurting the Inhabitants and Cattle'.[24] Crisp could certainly be regarded as one of the earliest environmentalists.

Crisp had also had considerable experience in the use of reverberatory furnaces and was not too sanguine about using German 'experts' which had been suggested: 'but they are in Germany no great proficients in Glass Works. ... It has cost me a great deal to find out that a German when he comes here knows little, their Fewells, materialls, and construction of their Furnaces are different, and to this Day do not know the true aplication(sic) of the reverberatory Furnace, which is the most usefull of all in the aplication (sic) of the Fewell of this Country' [that is coal]. He then went on to draw in section an English reverberatory fumace.[25]

He remained quite happy about the zaffre and smalt that he. was producing, writing that the smalt was ground in 'our Windmill' and the 'Zaffre made with the sand we use in the Composition of our Glaze'. He had also given four samples to an 'imminent (sic) Colourman with some of the best I could import from Saxony of the FFF'.[26] (This was a reference to the degree of fineness of the smalt.) The 'imminent Colourman' had found the smalt from Saxony to be the poorest of all and the other four 'greatly preferable to it'.[26]

But by 1765 or so Nicholas Crisp was in serious financial difficulties and had debts of over £18,000. The Cobalt Mining Company was in scarcely better case and seems to have ceased mining in about 1766. Nevertheless, samples were still being sent to Lambeth and Amsterdam in 1769 and cobalt derivatives were still being requested in 1775 and 1781.[27]

Today, cobalt's main use is in the hardening of steels which can only be shaped by forging and grinding, and the in manufacture of permanent magnets, not in the production of an attractive blue colour.

This paper was given at the BSHP Conference 2002 at Cardiff.

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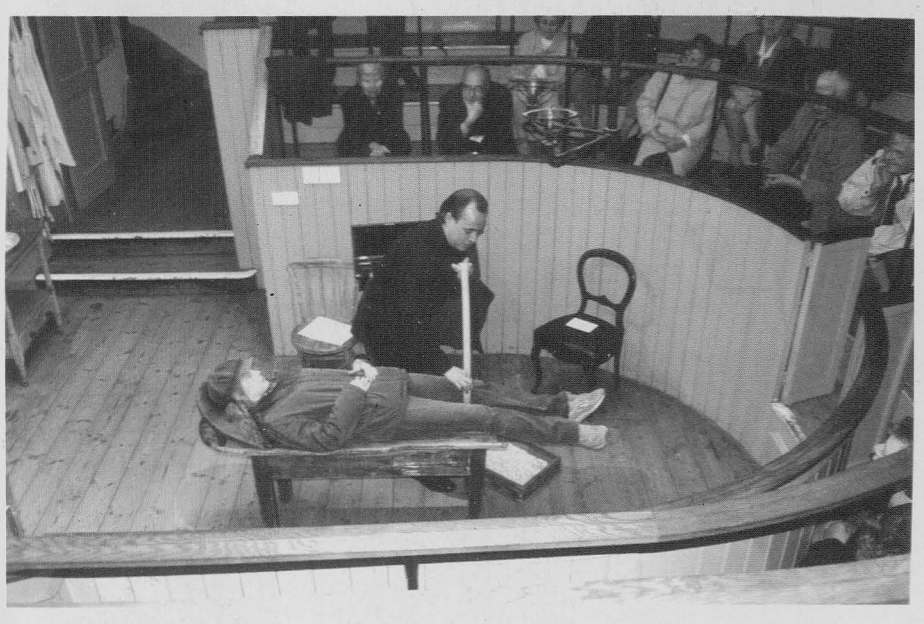
Dr Christiane Staiger and Dr Axel Helmstädter, authors of a paper at the BSHP Conference 2002 at Cardiff (see p. 33)

Dr Michael Jepson at the BSHP visit to the St Thomas' Hospital Herb Garret and Museum, June 2002 (right)



The Curator demonstrating a 19th century amputation to an audience of BSHP members in the restored Old Operating Theatre of St Thomas' Hospital

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Postcards and greetings cards from the Museum

Two of the range of 24 postcards and 4 greetings cards is on sale on behalf of the Museum from the Library issue desk at 1 Lambeth High Street. All the cards show images or objects from the Museum's fine collections.
The examples on this page are reproduced with permission.

Left: Wallis's Pharmacy, Essex Road, Islington, London 1902

Below: Thomas Rowlandson's caricature of 'The Quack doctor', published 1814. 'I have a secret art to cure each malady which men endure'.

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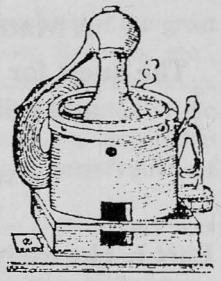

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Wednesday 12 March 2003 Foundation Lecture
'Intoxicating Vapours: Opium, Cannabis and Tobacco in 19th and 20th Century Britain' by Professor Virginia Berridge, at Lambeth

11–13 April 2003 BSHP Annual Spring Conference
To be held at Kings Manor Hotel, 100 Milton Road East, Edinburgh EH15 2NP.

Wednesday 7 May 2003
'Chemist-Opticians' by Mr Neil Handley, Curator, British Optical Association Museum, at Lambeth.

British Society for the History of Medicine Thursday – Sunday, 4-7 September 2003, 20th Congress at the University of Reading
Open to BSHP members, at theWhiteknights campus, Reading. It is expected that at least two BSHP members will be speakers. The themes of the congress will be Ancient and mediaeval medicine; Medicine in the Thames valley; Veterinary science, agriculture and medicine; Art, architecture and the environment; and Open sessions. There will also be visits. Papers and posters are welcomed. Further information and a registration form is available from the BSHP secretary: peter.homan@lineone.net *or* Congress Organiser, Mr Dermot O'Rourke, 38 Stanhope Road, Reading RG2 7HN *or* E-mail: dermot@ouvip.com

International Society for the History of Pharmacy 36th International Congress in Bucarest, Romania September 24–27, 2003. Details can be obtained from **www.histpharm.org**

It is with regret that we report the death at Milton Keynes on 29 October 2002 of **Mrs Enid Lucas-Smith**, BPharm, FRPharmS, FIPharmM, an early member of BSHP and committee member for many years, who was Treasurer, then President 1999–2000.

Membership Fees

Members are reminded that the membership fee was increased at the last AGM to £20.00 p.a. to help cover the costs of running the BSHP after the grant was withdrawn by the Royal Pharmaceutical Society. New Banker's Order forms are being circulated. If you pay tax on income, investments or capital gains in the UK you can help the Society by completing the accompanying Gift Aid Declaration so that tax can be reclaimed on your subscription/donation.

Review

Jacques Peschier (1769-1832).
Karl-Rudolf Reichenbach, 2001. Stuttgart: Wissenschaftliche Verlagsgesellschaft mbH Stuttgart, pp. 498. ISBN 3-8047-1909-0). Price €60.00, SFr 100.90.
Volume 3 in a series, the Greifswalder Schriften (writings from the northeast German University of Greifswald) on the history of pharmacy and social pharmacy, this book is the work of a Zürich-born pharmacist and describes the life and achievements of a remarkable Genevan apothecary and chemist.

Jacques Peschier was a member of a distinguished family of doctors, apothecaries and learned men. Under religious persecution in Languedoc, southern France, his grandfather emigrated and settled in protestant Geneva where he established an apothecary's business which passed from father to son and subsequently to grandson. Born into and fascinated by the pharmacy profession, Jacques Peschier was trained in Berlin at the Baron Apotheke of the famous German apothecary and teacher Martin Heinrich Klaproth, and here Jacques acquired his lifelong interest in research in botany and chemistry. Completing his studies in Geneva, he entered the family business initially with his father and later on his own. In this volume Karl-Rudolf Reichenbach has explored meticulously a wide range of published and unpublished letters, documents and records and has presented a fascinating picture of a pharmacist in the early days of science. *Continued on p. 64*

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A Matter of Standards:
The quest for authentic, reproducible and reliable plant drugs

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Part I. The early steps of authentication and standardisation

This paper honours the memory of Sir Hans Sloane (1660-1753), the eminent physician and scientist who was in 1721 presiding over the production of the *London Pharmacopoeia*. He was concerned about the quality of the medicines then available and ensured that, for the first time, the botanical names of the plant drugs included in the Materia Medica would be categorically stated. In so doing Hans Sloane was confirming a very important matter of standards.

From earliest times man had tried to remedy his illnesses and so commenced the long search for ideal plant drugs, a lengthy and on-going quest for the most reliable, reproducible and dependable plant drugs.

Our forebears readily separated food plants from toxic plants, but the in-between group of medicinal plants was to present major difficulties. As initially people lived in small self-contained communities with limited communication or friendly travel between the groups, the plants used in primitive medicine were culled from the local flora and were well-known to the tribal drug specialists. The word drug was probably derived much later from the Anglo-Saxon word *drygau* (= *to dry*) and the early practitioners in the woodlands or jungle clearings employed both fresh and dried local plant materials. The benefits of these plants were learnt by the earliest of all evaluation methods, trial and error.

The growth of early society meant not only population increase but also leisure for the upper classes and a concomitant demand for medicines and cosmetics from the then available natural sources. The ever-widening range of useful plants involved stimulated investigation of identities as well as uses.

Although some records are available concerning Assyrian (*ca* 2000 BC), Egyptian (*ca* 1000 BC) and Greek (*ca* 500 BC) medicinal plants, the first serious organised studies were apparently undertaken and recorded in Greece by Aristotle's student Theophrastus (370-285 BC), who had succeeded Aristotle (384-322 BC) as the director of the Lyceum in Athens. Theophrastus established the discipline of botany, clearly differentiating plants from the animals that his mentor Aristotle had so carefully studied and classified. His work underlined the importance of the empirical approach and the value of experimental evidence although it was Strato (*fl* 287-269 BC), his successor, who propounded the true course of research by observation and experimental proof. Theophrastus understood the folk medicine of his time and his herbal *Historia plantarum* or *The Enquiry into Plants* included currently known drugs such as Male Fern (*Dryopteris filix-mas* (L.) Schott.) and Ergot (*Claviceps purpurea* Tul.). He was able to distinguish Cinnamon (*Cinnamomum verum* J.S.Presl.) from Cassia (*Cinnamomum aromaticum* Nees), but word pictures, no matter how precise, cannot adequately present the true appearance of the plants. Illustration was, and is, essential.

The first known illustrated herbal or guidebook to medicinal plants was the *Rhizotomikon* (*Book of Herbs*) prepared by Cratevas, physician to the Roman emperor and student of toxicology Mithridates VI Eupator (120-63 BC). The quality of the early herbals is difficult to assess as few examples have survived, but the encyclopaedist Pliny the Elder (23-79 AD), who died in the eruption of Mount Vesuvius, referring to early medical treatises observed:

> Of these Cratevas, Dionysius and Metrodorus used a most pleasing method ... for they painted portraits of herbs and wrote their properties beneath.

This suggests that good illustrations and descriptions were unusual in his time. Indeed Charles Singer, the eminent medical historian, referred to Cratevas in 1927 as 'the father of botanical illustration'.

In the Roman era Pedanios Dioscorides (50-100 AD), sometime surgeon in the armies of the Emperor Nero Claudius Caesar, using earlier sources, his own observations and experience, and illustrations copied from Cratevas, produced a herbal describing some 600 plants. This herbal was copied on vellum in Constantinople in 512, the text being supported by coloured illustrations of varying quality. Known as the *Juliana Anicia Codex* or the *Codex Vindobonensis*, it now resides in the Austrian National Library and is important because it formed the basis of most books on Materia Medica until the 17th century. It was translated into English by John Goodyear in 1655 and reproduced with the original Byzantine illustrations in 1933 by R.T. Gunther.

Reproduction of pictures by manual copyists was laborious and difficult. Fortunately publication and therefore access to books was transformed when Johann Gutenburg (*ca* 1400-1468) of Mainz reputedly invented the printing press using movable type *ca* 1445. The laboriously drawn, sometimes much embellished and not always accurately painted, illustrations were soon replaced by crude woodcuts copying the illustrations of the earlier herbals.

The Latin *Herbarius*, a small quarto volume illustrated with small formalised woodcuts which were difficult to relate to known plants, was produced by Peter Schoeffer, a successor of Gutenburg in Mainz, in 1484. His German *Herbarius* published a year later, was larger and contained better, recognisable woodcuts. Although produced in black and white, the illustrations could be appropriately coloured after printing. Further improved was the

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German book *Hortus Sanitatis* (*Garden of Health*) printed by Jacob Meydenbach (Mainz, 1491), but these volumes still propagated the mysticism of medieval herbalism.

Four decades later in 1530 a major step forward took place when the *Herbarum vivae Eicones* or *Living Pictures of Herbs* appeared in Strasbourg. Written by Otto Brunfels (1488-1534), pastor, physician and botanist, it was illustrated with some 229 skilful, accurate, realistic drawings produced by Hans Weiditz (*fl* 1500-1535) and by an unknown woodcarver. The illustrations were superior and life-like, moving botany away from the strictures of medieval herbalism based on folklore, but the text still relied heavily on the earlier writings of Dioscorides and Pliny.

This scientific progress was consolidated by the physician-botanist Leonhart Fuchs (1501-1566) in his great work *De Historia Stirpium* (*Bookof Plants*, Basle, 1542), which incorporated accurate drawings by Albrecht Meyer that had been transferred to woodcuts by Heinrich Fullmaurer and Veit Rudolf Speckle. It offered greater detail in an organised, alphabetical presentation of plant names, form, habit, flowering and collection times, etc., together with medical information still based on Dioscorides, Pliny and Galen. Fuchs' aim was to improve the standards of medicine by accurate description of the then used drugs, leading to reliable identification and safer treatments.

The technique of engraved copperplate or copperplate etching superseded the woodblock method in the 17th century and remained dominant for over 200 years; the standard of illustration was thereby much improved.

The problem of the identification of plants could be approached in two ways. Either one cultivated the plants in gardens under personal supervision or one produced very careful specifications to ensure accurate authentication.

The earliest medical-botanical gardens were probably established in northern Italy in the early 16th century. Forest clearings, arable plots and monastic gardens had already pointed the way, but the need for good plants for the physicians and herbalists, especially for the *medicamentum simplex* or *simple* drug of the former, prompted the development of the medical botanical gardens in the Universities of Padua (1543), Pisa (1545) and Florence (1546). These gardens were centres of university study, not only of the plants themselves, but also of techniques of cultivation and best preparation methods for plant-derived medicines. The 16th century gardens also stimulated the production of the herbarium, the carefully stored and catalogued reference collection of representative dried and pressed botanical specimens fixed to sheets of stout paper or card.

Botanical gardens rapidly spread across Europe and were particularly associated with university medical schools. Their value as reference centres was increasingly important as the activities of the great explorers e.g.. Drake, Magellan, Raleigh, etc., widened the range of drugs in common use. But drugs from distant parts could not be transported in the fresh state; therefore more attention was directed to the description, identification and preservation of exotic drugs in the dried state.

An important publication in the 16th century was the *Commentarii in Sex Libros Pedacii Dioscorides* or *Commentaries on the Six Books of Pedanios Dioscorides* by Pietro Andrea Gregoria Mattioli (1501-1577). A Siennese physician at the Viennese Imperial Court, Mattioli was important because he collected and dried drugs for pharmacognostical purposes. His publications (1544-1565) included extensive annotations and commentary based on personal observation, carefully detailed illustrations and synonymous plant names in several languages. The Latin version of 1565 was widely used throughout Europe. Mattioli's illustrations were prepared by Giorgio Liberale of Udine and Wolfgang Meyerpeck and some have been reproduced in J. W. Krutch's *Herbal* (Phaidon, Oxford, 1976).

Another believer in precise descriptions was the physician-botanist Valerius Cordus (1515-1544). His monographs, including some 500 new drugs as well as known drugs such as Nux Vomica, were outstanding for their clarity and accuracy. In 1546, two years after his premature death by accident whilst on a botanical excursion, his dispensatory, usually known as the *Nuremburg Pharmacopoeia*, was published. Although including many earlier formulae, it presented his personal observations and critical annotations and set new standards in the quest for better pharmacopoeias.

The apothecaries' habit of using drugs *Quid pro quo*, an unsatisfactory practice of substitution, was deplored. Nevertheless in the 15th century Simon Januensis' texts *De Synonymis* and *Quid pro Quo* were considered standard reference volumes and, in the following century, the Paris physician Jacob Sylvius' *Quid pro Quo* list still remained in general use. There was indeed a pressing need for reproducible standards.

In Northern Europe the Flemish bookbinder turned printer Christophe Plantin of Antwerp (1520-1589) advanced the cause of excellent monographs by publishing the work of three outstanding scientists.

Rembert Dodoens (Dodonaeus)(1517-1586), Belgian botanist and physician, produced his extensive herbal or *Cruydeboek* in 1544. Based on earlier German work, e.g. Fuchs' writings, it grouped plants by their properties and reciprocal affinities.

Charles de l'Ecluse (Carolus Clusius)(1526-1609), French botanist, director of the Imperial Gardens in Vienna (1573-1587) and professor of botany at Leiden (1593-1609), studied materia medica including spices such as vanilla, pimento, star-anise and canella as well as gamboge. He collected illustrations, and his

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books *Exoticorum* and *Rarium Plantarum Historia* (1601) contained superior descriptions of the plants and numerous, mainly excellent, illustrations.

The third member of the group, the French botanist and physician, Matthias de l'Obel (Matthias Lobelius)(1538-1616), recorded first reports of some 80 British plants including *Atropa belladonna* L., the Deadly Nightshade, while residing in England. De l'Obel developed an interesting system of classification of plants based on leaf form in *Stirpium Adversaria Nova* (*New Medicinal Plants*, 1570).

The Swiss polymath Conrad Gessner (1516-1565), who had written on bibliography, linguistics, medicine, mineralogy, zoology and botany, produced outstanding, scientifically annotated, watercolours *ca* 1550. His plant classification was based on flowers, fruits and seeds (1542). His pupil Gaspard Bauhin (1560-1624) produced a comprehensive concordance or index of plant names in Basle in 1623 (*Pinax Theatri Botanici* or *Concordance of Botanical Terms*). Bauhin used a binomial system that was during the next 100 years adopted and further developed by John Ray (1628-1705) and Carl Linnaeus (1702-1778).

The systematic botanical study of materia medica was advancing steadily in continental Europe, but what of Britain?

Prominent amongst English herbals were those of William Turner, Henry Lyte, John Gerard, John Parkinson, Nicholas Culpeper and John Ray.

William Turner (1515-1568), an Anglican clergyman, has been suggested as the father of English botany. He ran a private botanical garden in Kew and claimed to have examined all the plants that he described in his *A New Herball*. Certainly he compiled the first scientific record of some 238 British plants but most of his illustrations were derived from Fuchs' earlier work. Turner's herbal was published in parts in 1551, 1562 and 1568.

Henry Lyte's *A Niewe Herball* (1578) was an English translation derived from Clusius' French version of Dodoens' Dutch *Cruydeboek* with additions, corrections and amendments.

Such English herbals were essential, despite their deficiencies, because not all practitioners were really competent in Latin or in continental languages.

John Gerard (1542-1612) of Nantwich, Cheshire published his famous herbal in 1597. Although a barber-surgeon, he achieved great success as a gardener in his own physic garden off Chancery Lane in the City of London. Gerard exploited the deceased Dr Priest's almost completed English translation of Dodoens' *Stirpium Historiae Pemptades* (1583), rearranged it according to Matthew de l'Obel's classification scheme, and illustrated it with some 1800 woodcuts culled from Christophe Plantin's blocks. The work was not well prepared as many illustrations were misplaced but the Yorkshire-born London apothecary Thomas Johnson (*ca* 1604-1644), aided by John Goodyear, produced two enlarged and much corrected editions in 1633 and 1636. Johnson stressed the great value of plants in his quotation:

> God of His infinite goodnesse and bounty hath by the medium of plants, bestowed almost all food, clothing and medicine upon man.

Johnson believed in practical botany in the field and his accounts in *Herborisings* (1629, 1632) describe botanical excursions in the London suburbs by apothecaries and their apprentices, cataloguing for the first time the plants of the London area.

Had Johnson's life not been prematurely terminated by a wound received while he was defending Basing House, Hampshire, for the King during the Civil War (1642-1648), a more interesting work jointly produced with his good friend John Goodyear would have emerged. Edited reprints of Gerard's herbal are still available (Bracken Books, 1985, ed. Marcus Woodward).

The works of John Parkinson (1567-1629), *Paradisi in Sole Paradisus Terrestris* or *A Garden of all sorts of pleasant flowers which an English ayre will permit to be noursed up* (1629) and *Theatrum Botanicum* (1640), are the output of a man who lived in Long Acre and combined the skills of an apothecary and a successful gardener. His descriptions of the drugs then in use are still valuable as a source of detailed information.

Better known is Nicholas Culpeper (1616-1654).

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A self-styled apothecary who had served an apprenticeship in London, he was much trusted and respected by his clients. He too possessed a large garden, sited in Artillery Lane, and grew many of the plants described in his *English Physician Enlarged* (1653). Nevertheless his many writings incorporated, as well as the old humoral pathology, astrological theories that were unacceptable to the emerging scientific community. His success as a practitioner was probably due more to his keen 108lbs observation and empirical practice than to his inferior published theories. Despite that, Culpeper's herbal has survived and is still freely available in all good bookshops, albeit with a warning statement in the preface.

Although some of his adversaries challenged Culpeper's ideas, many such as William Coles, herbalist and author of *The Art of Simpling* (1656), still clung tenaciously to the concepts of the Doctrine of Signatures or Similitudes. All was not well. Poor herbals led to low standards due to inadequate and careless description of plant sources and thus poor quality drugs.

One opponent of both Culpeper and Coles was John Ray (1628-1705), Cambridge scholar, pioneer scientist, English botanist and friend of Hans Sloane. Ray recognised the importance of sexuality in plants and published a valuable catalogue of the English flora in 1670 as well as a herbal *Historia Plantarum* which was published in 3 volumes between 1686 and 1784. He contributed greatly to plant classification and accurate description of drugs and his views undoubtedly influenced Sloane.

Part II. Hans Sloane and the route to modern standardised drugs

Contemporary records confirm that in the 17th and early 18th centuries drug standards were not good. Reports from the censors appointed by the Royal College of Physicians (1518-1856) indicate that as late as the early 19th century the quality of drugs was still not ideal, unsatisfactory and deteriorating drugs being recorded for some of the shops visited.

The cleaning or garbling of drugs and spices had commenced in the City of London in 1393, an independent appointed Garbler or Garbeller being entrusted with the task of cleaning, weighing and sealing packages of drugs and spices in collaboration with the Common Weigher. The practice of garbling spread to the major ports and continued up to about 1700. An Act of King James (1604) was introduced to rectify 'greate Deceipte and Abuses committed in ... sellinge corrupt and mingled Spices, Drugges, Wares' and consolidated the position of the Garbler, who would continue to garble, divide and seal and, in addition, who could enter premises to search and garble within the City of London. Thus the apothecaries in 1604 hoped to acquire reliable 'well garbled' drugs and this aspiration was further encouraged by the requirement in 1618 that apothecaries should follow implicitly the stipulations of the new *London Pharmacopoeia*.

Another difficulty arose from the practice of the millers. The apothecaries and druggists were handling an ever-increasing range of crude botanical drugs and, in order to prepare their own galenical preparations e.g. decoctions, tinctures, extracts, etc., they would send their drugs to the miller for pulverisation. The druggists unrealistically expected of powder for every 112lbs of drug; therefore adulteration was common and the adulterants employed were often more toxic than the original drug. As a consequence, not only did apothecaries grow their own indigenous plants but also, to protect the apothecaries' interests, wholesale druggists set up their own grinding plant and prepared galenicals and thus commenced the commercial production of good quality extracts, tinctures, ointments, etc. which would dominate practice into the early 20th Century.

The Apothecaries Society, founded in 1617, likewise sought to maintain standards and therefore opened its own dispensary in order to provide its freemen with reliable compounded preparations because they could not trust the grocers and druggists. In addition, in the period 1627-1665 the Society organised monthly 'herborisings' for apprentices during the six summer months in order to improve the botanical expertise of future apothecaries. This probably encouraged the spread of physic gardens adjacent to apothecaries' premises. The quest for standards had become so important, both for chemical and for biological drugs, that the Apothecaries Society also established a chemical laboratory in 1671 and was able therefore to supply pure chemicals as well as reliable galenical preparations to its freemen.

Nevertheless J. Quincy in his *A Compleat English Dispensatory* (2nd edn, London, 1719) made many derogatory observations concerning 'wholesale apothecaries and chymists who deal in medicines for their sale' referring to adulteration and intense competition.

The 17th and early 18th centuries formed an important period for the Society of Apothecaries. Unlike the rather theoretical and conservative physicians, many apothecaries were adopting a more scientific approach to medicine, an approach comprising experimentation and observation with new vegetable drugs such as ipecacuanha root, cinchona bark and coca leaves and with chemical drugs. The apothecaries were emerging as able general practitioners of medicine and their position was consolidated by the Rose case (1703-1704). At this point, when standards needed clear definition, into the story comes Hans Sloane (1660-1753).

Born in Killyleagh on Strangford Lough, County Down, Northern Ireland on April 16th, 1660, Hans Sloane was the youngest of the seven sons of Scottish parents. His father was the Receiver-General of Taxes

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and Hans enjoyed his childhood in an area rich in natural habitats and populations of plants. In 1679 he arrived in London to study medicine and lodged in Water Lane next to the Society of Apothecaries laboratory. He studied botany at the Society's physic garden and was a friend of John Ray and Robert Boyle. Qualifying in medicine at the University of Orange, near Avignon in southern France, he made friends with the French pharmaceutical chemist Nicholas Lemery (1645-1715) and the notable French botanist Joseph Pitton de Tournefort (1656-1708), a man only four years older than himself and already Professor of Botany at the Jardin du Roi in Paris. Returning to Britain, Sloane was recommended to the eminent physician Thomas Sydenham (1624-1689) by the renowned scientist Robert Boyle (1627-1691).

Sydenham, unlike most of his contemporaries, believed in the careful examination of the patient for clinical signs and symptoms, the construction of comprehensive case histories and concentration on practical help that would alleviate suffering. Despite his training at Oxford and Montpellier, he regarded the theoretical medical science of his time as of little practical value in healing the unwell. Instead he prepared carefully detailed clinical profiles of many diseases including malaria, scarlet fever, measles, gout, dysentery and hysteria and he preferred 'simple' drugs rather than the complex polypharmaceuticals of his day.

As a skilful anatomist, a good botanist and, thanks to Sydenham, a competent clinician, Sloane was well equipped for a 15-month expedition to Jamaica as personal physician to the Duke of Albemarle (1687-1688). He used his opportunity well and collected data about and samples of some 800 new plant species, a catalogue of which was published in 1696 when Sloane was 36 years old.

Sloane's professional aptitude and ability ensured his standing as a successful and respected physician with eminent patients such as the Duke of Albemarle, Queen Anne, King George II and Samuel Pepys.

In 1712 he purchased the Manor of Chelsea from Lord Cheyne. The manor included the approximately four acres of land used since Michaelmas 1673 by the Society of Apothecaries as a physic garden with boathouse. In 1716 he was created baronet and was the first physician to receive a hereditary title.

In 1721, under his presidency of the Royal College of Physicians, a new fourth edition of the *Pharmacopoeia Londonensis* was produced. The preface indicated that

> the catalogue of simples has been drawn up entirely *de novo*: the name of each plant and in some cases there is more than one, has been annexed: as well as the officinal name, as that which is retained by the more accurate botanists. Those who know how easily plants of the same genus and name may be confounded, must clearly see that errors could scarcely have been avoided in any other way than by employing the distinction of terms.

Sloane's love of botany produced the precise definition of the plants and brief botanical descriptions of the species involved. In addition, there was some reduction in the number of archaic polypharmaceutical formulae: unsavoury simples such as dog's dung (album graecum), moss of a dead man's skull (usnea cranii humani), human bladder calculi and dubious unicorn's horn were deleted and the ultimate Catalogue of Simples suggests Sir Hans' direct involvement. In the context of his times Sir Hans Sloane facilitated a major improvement in standards and injected scientific method into medicine with clear separation of fact, experimental evidence and observation from speculative hypothesis.

In the early 1700s there was a desire to adopt 'a more correct and concise method of prescribing' but good prescribing relied on good drugs. The Chelsea Physic Garden had commenced in 1673 with the expressed aim of producing good drugs, but it was leased from the Manor of Chelsea. The new owner, Sir Hans, who was obviously on very good terms with the apothecaries, due probably to his early studies in the Garden and his association with Sydenham and his distinguished neighbour, the Court Apothecary Daniel Malthus, and other learned apothecaries, conveyed the property to the Society of Apothecaries in perpetuity in 1722. His interest was clearly emphasised in the object of the foundation viz.

> so that apprentices and others may better distinguish good and useful plants from those that bear resemblance to them and yet are hurtful.

Sir Hans Sloane not only formalised the position of the Chelsea Physic Garden, he facilitated some very distinguished users. One was Elizabeth Blackwell (*d* 1758), an Aberdonian unhappily married to a wayward physician; she was a fine artist who specialised in botanical illustration. She showed some of her drawings to Hans Sloane and some other members of the Society of Apothecaries and they approved and encouraged her endeavours. Mrs Blackwell moved to Swan Walk, Chelsea and was able to use the garden for source material. Some 500 of her drawings were converted to engravings and the plates were published, initially in weekly instalments, and later in a 2-volume collection *The Curious Herbal* (1737-1739). Reliable reference diagrams of 'simples' and other medicinal plants were imperative if standards were to be maintained and Mrs Blackwell, supported by patrons such as Sloane and his physician colleague Richard Mead, could hardly fail with her excellent reference diagrams. Although Elizabeth Blackwell died in 1758 and was interred in Chelsea Churchyard, her work was taken up by the Nuremberg physician and publisher of botanical texts Christophe Jacob Trew (1695-1769) and, after revision in accord with Linnaeus' ideas, was published as the *Herbarium Blackwellianum* in 6 volumes (1773). Facsimiles of some of her paintings were still being sold in the Johannes Gutenberg Museum in Mainz in 1993.

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Another brilliant artist was Georg Dionysius Ehret (1708-1770), a Heidelberg-born gardener turned painter. After experience in Regensburg, West Germany as an illustrator with an apothecary, he travelled through Switzerland, Holland and France before reaching London in 1735. His association with the physician-publisher Trew in Nuremberg and with the botanist Bernard de Jussieu (1699-1777) in the Jardin du Roi in Paris ensured his entry to influential groups in London and he, too, met Sir Hans Sloane and used the facilities of Chelsea's excellent garden. Although he returned to Holland to work with the great botanist Carl von Linné (*Carolus Linnaeus*, 1707-1778), he was back by the end of 1736 and remained until his death in 1770. Residing with the outstanding horticulturist Philip Miller, who had done so much to establish the Chelsea garden, he married Miller's sister. Breaking away from the background of a gardener proved difficult; he sought equality with the scientists of the day and probably because of his innate talent and his association with Richard Mead and other leading physicians, apothecaries and aristocratic botany enthusiasts of the day he was finally elected a member of the Royal Society in 1757, the society that Sir Hans Sloane had presided over from 1727 to 1740 in succession to Sir Isaac Newton. Ehret's paintings set a very high standard of natural presentation that enabled easy recognition of the plants.

Examples of the work of Elizabeth Blackwell and Georg Ehret have been reproduced in *The Herbal of the Count Palatine* published by Harrap Ltd, London in 1985.

Hans Sloane's improvements to the *Pharmacopoeia Londonensis* of 1721 were further advanced in the 6th edition (1788) when the binomial system of botanical nomenclature developed by Linnaeus in his *Species Plantarum* of 1753 being fully adopted.

The practice of medicine changed little in the period 1700-1850 as far as the vast majority of people was concerned, although the pharmaceutical and medical roles of the apothecaries separated in the early 1800s. Those apothecaries favouring pharmacy joined with a group of chemists and druggists to form the Pharmaceutical Society of Great Britain in 1841. Most apothecaries continued with the general practice of medicine and the baton of plant drug standardisation passed from the apothecaries to the pharmacists and, particularly, to the pharmacognosists.

Standardisation assumed a new importance in the 9th edition of the *Pharmacopoeia Londonensis* (1836). Richard Phillips FRS (1777-1851), a London chemist and druggist specialising in chemistry, had criticised the 7th (1809) and 8th (1824) editions and was invited to join the Pharmacopoeia Revision Committee as editor. His influence ensured that accurate weights and tests for impurities were continuing features of future pharmacopoeias.

Part III. The British Pharmacopoeia and standardisation in the 19th and 20th centuries

The *British Pharmacopoeia*, published for the first time in 1864, stipulated that standard monographs should apply throughout the British Isles. Pharmacy by its involvement was emerging as a recognised responsible profession in its own right.

The production of good books devoted specifically to botanical drugs developed in the late 17th century with Pierre Pomet's well illustrated *Histoire Générale des Drogues* (Paris, 1694), Nicholas Lemery's *Traité Universal des Drogues Simples* (Paris, 1697), *Dictionnaire des Drogues Simples* (4th edn, Paris, 1727) and Etienne Francois Geoffroy's *Tractatus de Materia Medica* (Paris, 1741). Significantly Lemery and Geoffroy were friends and correspondents with Hans Sloane, discussing topics such as Pareira Brava root (*Chondodendron tomentosum* Ruiz et Pav.) which is now better known as a source of curare.

Nicholas Jean-Baptiste Guibort's *Histoire Abrégée des Drogues Simples* (Paris, 1820) was a true pharmacognostical treatise based on the author's own experience. The name 'pharmacognosy' had come into use in 1815 when Seydler employed it to describe the study of crude drugs of biological origin.

Adulteration of foods and drugs worried responsible scientists in the early 19th century. In Britain Frederick Christian Accum (1769-1838), a German apothecary turned chemistry lecturer, campaigned vigorously, citing specific cases of sophistication in his book *A Treatise on the Adulteration of Food and Culinary Poisons, exhibiting the fraudulent sophistication of Bread, Beer, Wine, Spiritous Liquors, Tea, Coffee, etc., and other articles employed in the domestic economy and Methods of detecting them* (London, 1820). Accum's lead was pursued diligently by the surgeon-apothecary John Postgate (1820-1881), who submitted no less than 9 bills to Parliament before the passage of the 1860 Act for Preventing the Adulteration of Food and Drink, an Act extended to include drugs in 1868.

Postgate's efforts received considerable backing from a series of reports published in the *Lancet* in 1851-1855 by Dr A.H. Hassall and including common foods and spices and some drugs. The Bradford lozenge poisonings in 1858, caused by a druggist's lad adulterating to order peppermint lozenges with Plaster of Paris that was really white arsenic, resulted in 17 fatalities and severe side-effects for the other 200 users, but that tragic accident helped Postgate's case.

Prevention of adulteration depended on efficient detection and two types of reference source: good textbooks and authoritative pharmacopoeias. The newly formed Pharmaceutical Society was soon involved. Its School of Pharmacy was founded in 1842 and quickly recruited a staff of outstanding teachers including Jonathan Pereira (1804-1853),

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Anthony Todd Thomson (1778-1849), Theophilus Redwood (1808-1892) and George Fownes (1815-1849).

Jonathan Pereira, apothecary, surgeon, physician and gifted teacher of materia medica combined pharmacognosy and the then pharmacology in his *The Elements of Materia Medica and Therapeutics* published in two volumes in 1839-1840. Pereira, like Hans Sloane before him, amassed a museum of reference samples. Hans Sloane's collection resides in the British Museum; Pereira's collection was later expanded to form the Collection of Crude Drugs and Herbaria of the Pharmaceutical Society of Great Britain, a reference collection that was housed in the University of Bradford from 1969-1983 before transfer to the Economic Botany Division, Sir Joseph Banks Centre, Royal Botanic Gardens, Kew.

The School of Pharmacy produced some remarkable students; prominent amongst them was Daniel Hanbury (1825-1875), eldest son of Daniel Bell Hanbury of the Plough Court Pharmacy, Lombard Street, London. A frequent contributor to the scientific meetings of the early Pharmaceutical Society and the author of over 200 scientific papers, he was much respected for the careful, exact manner in which he described drugs. In collaboration with Friedrich A. Flückiger, a professor of materia medica in Berne and subsequently Strasbourg, Hanbury produced a valuable source book of 19th century botanical drugs, *The Pharmacographia, A History of Drugs* (London, 1874). The layout presented a fixed pattern for each drug under the headings: botanical origin, history, macroscopical description, essential microscopical features, chemical composition, uses and adulteration. Copious footnotes provided illuminating references to information sources, including some references to Hans Sloane's descriptions and figures. Surprisingly, this excellent work included no diagrams although reference was made to Flückiger's well-illustrated *Grundlagen der pharmaceutischen Waarenkunde, Einleitung in das Studium der Pharmacognosie* (Berlin, 1873), Otto Berg's *Anatomischer Atlas zu pharmaceutischen Waarenkunde* (Berlin, 1865) and Gustave Planchon's *Traite Pratique de la Détermination des Drogues Simples d'Origine Végétale* (Paris, 1874). However, such foreign language references were not very helpful to the typical monoglot English-speaking practitioner but, fortunately, the work of other pharmaceutical scientists came to the rescue.

The distinguished pharmaceutical-medical botanist Robert Bentley (1821-1893), pharmacist and physician and Professor of Materia Medica in the Pharmaceutical Society's school, in partnership with Henry Trimen, produced amongst other books, a timely 4-volume guide entitled *Medicinal Plants* (1876-1880). This work included 306 carefully prepared plates by David Blair.

Another renowned pharmacognosist was Edward Morell Holmes (1843-1930). A pharmacist and botanist, Holmes devoted his life to building up the Pharmaceutical Society's museum collection which was based on Pereira's materia medica collection and collections obtained from the International Exhibitions of 1850-1851 and 1860. With about 20,000 specimens at his disposal Holmes, who was the curator for 50 years (1872-1922), was able to publish more than 300 contributions enhancing the accurate authentication of drugs by comparison with genuine reference samples.

Henry George Greenish (1855-1933) was an outstanding student at the School of Pharmacy in 1876. Specialising in materia medica, he became a lecturer (1890) and Professor of Materia Medica (1893) and subsequently Dean of the School. His *Textbook of Materia Medica* was also not generously illustrated but he had spotted a glaring omission in the list of available reference volumes. The German botanist Jacob Mathias Schleiden (1804-1881) had, in 1847, demonstrated the value of the microscope in differentiating botanical drugs by their structural characteristics and variations. Therefore Greenish published the *Microscopical Examination of Foods and Drugs* (1903) and an even more valuable *Anatomical Atlas of Vegetable Powders* with Eugene Collin in 1904. Although his *Textbook of Materia Medica* appeared as 6 editions between 1899 and 1933, it was the *Anatomical Atlas* that was prized because it was the sole English-language text available until Betty P. Jackson and Derek W. Snowdon produced a much needed, carefully illustrated *An Atlas of Vegetable Drugs* in 1968 and an *Atlas of Microscopy of Medicinal Plants, Culinary Herbs and Spices* containing over 400 illustrations in 1990.

The work of Bentley, Holmes and Greenish influenced the pattern of the fourth *British Pharmacopoeia* (1898). Monographs included references to published illustrations of the specific plants in works such as Bentley and Trimen's *Medicinal Plants*. The characters of the drug and tests for identity and purity were also included: e.g. for Saffron, *Crocus sativus* L., it was stated that an orange yellow tint should be left on wet fingers, it colours water orange yellow, becomes paler itself and does not deposit any white or coloured powder (limit on adulteration). Ash and moisture limits were indicated but histological data was minimal unless considered necessary e.g. for Belladonna Root.

By 1914, when the fifth *British Pharmacopoeia* was published under the co-editorship of Greenish, the references to published illustrations had been omitted but the written descriptions, including histology, were more detailed. Total alkaloidal assays were included for appropriate important drugs e.g. Ipecacuanha root, Nux Vomica seed, Cinchona bark and Belladonna leaves, although paradoxically assays were not required for Belladonna's close relatives

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Hyoscyamus (Henbane) and Stramonium (Thorn-apple).

Shortly afterwards, in 1919, Thomas Edward Wallis (1876-1973), a former student under Greenish, an experienced college lecturer and foods and drugs analyst, joined the staff of the School of Pharmacy in Bloomsbury Square as a lecturer in botany. His reputation was quickly established by his discovery of the lycopodium spore method of quantitative microscopy in the early 1920s. Wallis demanded a very high standard which was copied and maintained in the plant anatomy publications of many more recent pharmacognosists e.g. Fairbairn, Rowson, Jackson, Shellard, Evans, Fell, Court, etc.

Prior to Wallis' work, microscopical descriptions were normally qualitative, characterising the finer microscopical structures in medicinal plant material. Wallis adopted precise micromeasurements as recommended by J.W. Moll and H.H. Janssonius in their book *Botanical Pen Portraits* (The Hague, 1923) and set a new standard for pharmacopoeial monographs and for his textbooks on pharmacognosy (1946) and analytical microscopy (1965).

Consequent on Wallis' contributions to the standardisation of crude biological drugs, adulteration was almost non-existent but medicine was changing rapidly in the mid-20th century with dramatic developments in allopathic synthetic medicines that could be readily purified and standardised. Nevertheless, many synthetic drugs were and still are derived from complex precursors such as alkaloids and glycosides which are difficult to synthesise commercially although found as active principles in plants.

It had been claimed that vegetable drugs could be quite easily identified by a more or less macroscopical and microscopical examination. We now know that plants yield extremely complex mixtures of chemical compounds in fluctuating amounts and this was a formidable obstacle to reliable standardisation. How could the true pattern of chemical components be displayed qualitatively and quantitatively as an aid to the characterisation of the plant drug?

The technique of column chromatography, devised by the Russian botanist Mikhail Semyonovich Tsvet (or Tswett, 1872-1919) in 1903, separated plant pigments such as chlorophyll in a slow and tedious manner by passage down a column of adsorbent substances such as alumina, cellulose or silica . Paper partition chromatography, differential separation of compounds by solvent movement across filter paper, was introduced by the biochemists Consden, Gordon, Martin and Synge in England in 1944 but the method was limited by poor resolution, unreliable reproducibility, difficulties in handling large wet papers, etc.

Fortunately many of these problems were solved in 1957 when the German pharmacognosist Egon Stahl (1925-1986), working in the University of Saarland, invented a system of chemical separation called thin layer chromatography (TLC) employing thin layers of adsorbent materials such as silica, cellulose or alumina spread evenly on glass plates. Plant constituents could be separated under appropriate defined conditions when spots of plant extracts were developed as suitable solvents rose up the rigid plates. The plates were subsequently dried and then sprayed with specific chemical reagents to yield patterns of, for example, alkaloids, glycosides, tannins, amino acids, etc. TLC is still a simple yet very important analytical tool and the British pharmacognosists e.g. James Wight Fairbairn (1914-1982) and Edward Joseph Shellard (1913-) played an important role in the application of TLC (Shellard, 1968). Further developments by Martin and James (1952) included vapour-phase or gas-liquid chromatography (GLC), a system in which the stationary liquid phase is adsorbed on an inert solid support packed in a column and the substance to be analysed is vaporised and passed into the column in a suitable carrier gas; detection of separated components is performed with appropriate amplifying and recording instruments e.g. potentiometers, spectrophotometers, etc. Another valuable modern technique, which is based on the work in 1964 of J. Calvin Giddings (USA) and István Halász (Germany), is high pressure or high performance liquid chromatography (HPLC), a development of column chromatography in which the column is packed with small particle size (5-10 μm) adsorbent and a liquid mobile phase is pumped into the column under high pressure. HPLC technique is now the dominant separation method and also requires efficient instruments for detection of the separated components. Thus armed with modern methods the plant material can be chemically assessed qualitatively and quantitatively before any further processing.

Today, thanks to the efforts of our illustrious forbears, our standards include macroscopy, sensory characters and tests, qualitative and quantitative microscopy and the many techniques of chromatography. We can standardise our raw materials with considerable accuracy and can rapidly detect adulteration. Yet, paradoxically, there are on the open market herbal medicinal products that are subject to no clearly defined standards. In 2002 we still read of argument and counter-argument concerning the value and safety of plants such as ginseng (*Panax* spp.), St. John's wort (*Hypericum perfoliatum* L.), butterbur (*Petasites hybridus* L.) and coltsfoot (*Tussilago farfara* L.). The European Commission, facing the worldwide demand for herbal medicines, has proposed a simplified registration system for traditional herbal medicines; quality requirements will be the same as for medicines although efficacy will be assessed on the basis of information on traditional use gathered in at least the previous 30 years rather than on carefully designed tests and trials

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on safety and efficacy. It is intended that monographs will be established in order to further harmonise herbal medicinal products throughout Europe.

In a world where allopathic medicines have produced unanticipated side-effects as well as great advances in therapeutics, many persons have turned back to herbal products arguing that such medicines have been traditionally used and are therefore safe. Was the quest for standards by our pharmaceutical forbears a story of great effort to no purpose? I like to think not, as workable standards must always be the ultimate over-riding requirement for safe, reliable foods and drugs, and it is only a matter of time before stipulations are enforced in the interest of quality, efficacy and public safety.

Many potentially useful plants still require investigation and probably conservation as medicines, or as sources of precursors of medicinal compounds, or simply for scientific interest. Therefore the techniques that have been developed remain valid and essential.

In separating experimental observation and fact from hypothesis and myth the esteemed Hans Sloane acted as a vital pivot between the earlier, folkloric, herbal medicine and the newer, methodical, scientific use of plants in orthodox medicine.

His personal contribution to the botany of materia medica set a standard of purpose and scientific integrity. His botanical collections offered a standard of authenticity that can still be referred to today. His cooperation with and encouragement of fellow scientists and scholars set a standard of teamwork that is so vital in research programmes in our modern, complex, scientific world. Sir Hans Sloane's life's work proved that real success in science and society is, after all, a matter of standards.

The three parts of this paper are derived from the Hans Sloane Memorial Lecture delivered at Chelsea Physic Garden in 1991 and plenary lectures given in the Universities of Mainz, Germany in 1993 and Malta in 1995.

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Records

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National, Special and University

Aberdeen University Library, Department of Special Collections and Archives, DISS, Heritage Division, King's College, Aberdeen AB24 3SW: Hans Kosterlitz (1903-96), pharmacologist: papers

Public Record Office of Northern Ireland, 66 Balmoral Avenue, Belfast BT9 6NY: Pharmaceutical Society of Northern Ireland: minutes, corresp and photographs 1925-82

Science Museum Library, Imperial College Road, South Kensington, London SW7 SNH: Collection of papers rel to life and work of Arthur Robertson Cushny and Bernard Beryl Brodie, pharmacists

Wellcome Library for the History and Understanding of Medicine, Archives and Manuscripts Section, 183 Euston Road, London NW1 2BE: M Coleman (?), chemist: recipe book c 1850 (MS.7895)

Local Repositories in England

Cumbria Record Office, Carlisle Headquarters, The Castle, Carlisle CA3 8UR: John Robson, chemist, Carlisle: records 19th cent (DB 138)

Gloucestershire Record Office, Clarence Row, Off Alvin Street, Gloucester GL1 3DW: Co-operative chemists, Cheltenham: prescription books 1947-89 (D8881); W T Slatter, chemist, Gloucester: accounts 1905-49 (D8842)

Hackney Archives Department, 43 De Beauvoir Road, Hackney, London N1 5SQ: Chemist, Dalston: prescription register c 1895-1913 (M 4616)

Lancashire Record Office, Bow Lane, Preston PR1 2RE: Peter Doyle, dispensing chemist, Darwen: prescription registers c1880-1977 (DDX 2314)

Medway Archives and Local Studies Centre, Civic Centre, Strood, Rochester ME2 4AU: Robert Watts and Vernon Henry Watts, chemists: records c 1842-1973 (DE755)

Norfolk Record Office, Gildengate House, Anglia Square, Upper Green Lane, Norwich NR3: De Carle & Son, manufacturing chemists, Norwich: liquidation papers 1936-40

North Devon Record Office, North Devon Library and Record Office, Tuly Street, Barnstaple EX31 1EL: J J Tremeer, chemist, Barnstaple: prescription book 1881-92 (621/0)

Continued in next issue

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The Town of St. Gall and its Cathedral

Dr J. Burnby

The town of St. Gall (or St. Gallen as it is also called) lies in the north eastern part of Switzerland. It has a magnificent baroque cathedral (if you care for the baroque style of architecture) and above all a famous library, within which there are over two thousand manuscripts and 1700 incunabulae or early printed books. The town owes its origins to a wandering Irish monk, St. Gallus, who began a hermitage there. It was, many years later, a centre for cotton manufacture, and close by the fine waterfalls are tiers of old buildings which would be of keen interest to an industrial archaeologist, though most have been by now turned into flats.

From a historian of pharmacy's point of view, however, it is the library which holds the main interest. This library possesses the first known plan of a herb garden (Figure 1), which is thought to date from as early as 820 AD, that is just after the death of the great king of the Franks, Charlemagne (*c*742–814 AD).

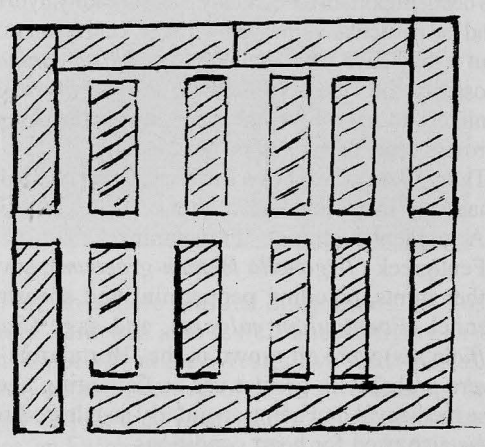

Figure 1. The Herbularius showing the herb beds at St. Gall

It has to be remembered that this was a garden for a monastery, and not one purely for pleasure as would have been one attached to an early mediaeval castle or palace. It seems fairly certain however that this plan was based on article 70 of the *Capitulare De Villis,* in which Charlemagne had sent out a decree stating what he wished to be grown on his estates in the Carolingian empire.This *Capitulare* is undated but thought to be 812 AD. The total of plants included 16 kinds of fruits and nuts and 73 herbs,making 89 species in all, with half a dozen named varieties of apples, and as many pears. Most but not all could have been grown in England.[1]

The plants on the plan were not as comprehensive as those sent out earlier by Charlemagne.[2] The plan itself is outlined in red, and measures about 45 x 30 inches (114 x 76 cm) on five pieces of parchment sewn together. There are two different hands on it, one known to be that of the scholar and librarian, Reginbert who died in 846 AD. Possibly, the plan is a copy and originated in the abbey of Reichenau, the monks bringing it to St. Gall, which would explain the dedication of 'St. Mary and St. Gall'.[3]

The plan is very detailed and gives the names in Latin of 16 plants used in medicine. It is noticeable however that although the medicinal herbs have been allotted 16 plots, the kitchen garden is larger and has 18 beds. It would seem that this plan had been given to Abbot Gozbert whose dates are between 816 and 837 AD, as may be seen in the small lettering in

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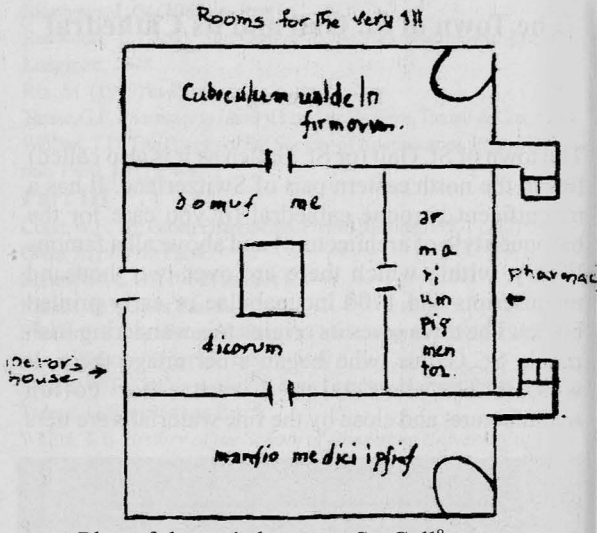
one corner. The general opinion is that it is from about 820 AD.

The all-important list of the *Herbularius,* as it was named, consisted of:

1. Lilies. Probably *Lilium candidum* or the Madonna Lily, which has a strong claim to being the oldest domesticated flower. Lilies were to be found in several medicines and drinks.[3]
2. Roses. A high proportion of recipes once contained the rose in one form or another as it was once regarded as being important medicinally. Roses readily hybridise and the particular variety grown at St. Gall is unknown, but it may have been the Dog Rose (*Rosa canina*) or possibly the sweet-scented *Rosa rubiginosa*. It is unlikely to have been the fragrant Apothecaries' or Provins rose, despite its name.
3. There were at least two different types of beans, a mainstay in the mediaeval diet.
4. A unidentified mint, 'Frauenminze'.
5. Fenugreek (*Trigonella foenum-graecum*); several other mints,including peppermint and spearmint; fennel (*Foeniculum vulgare*), and sage (*Salvia officinalis*) were all grown in the 'Hortularius' but were probably in greater use as flavouring agents, the mediaeval diet being singularly tasteless, though was also used for heart conditions.
6. Rue (*Ruta graveolens*) had a number of uses; it was thought to be an excellent preventative against venomous snakes, poisons and even the toad.
7. Pennyroyal (*Mentha pulegium*) was used for coughs and problems of the lungs, stomach and heart, and above all as a destroyer of fleas.
8. Lovage (*Levisticum officinalis*) had a number of uses as a medicine, but later was used only as a spice.
9. Caraway seeds (*Carum carvi*) were also grown and had many medicinal uses.
10. Rosemary (*Rosmarinus officinalis*) was regarded as an excellent disinfectant, and could be taken as a tea.
11. The root of the Iris, possibly *Iris pseudoacorus* or wild yellow flag was also deemed to have medicinal uses.
12. 'Costo' or 'Frauenminze', another mint, but not identified.
13. 'Cumino' which had many medicinal uses. It may be the cummin to be found in curry, but is more likely to be caraway (*Carum carvi*) which was a native of Europe.
14. 'Sisimbria' which seems to be yet another mint, possibly *Mentha aquatica*; it was used for angina and heart conditions.

It has been suggested that this plan of St. Gall ought to be more correctly called 'The Reichenauer Plan' and that the plant list was due to Walafrid Strabo (*c* 806-849), Abbot of Reichenau by 842. It is known that Rabanus of the Abbey of Fulda had once had Strabo as his pupil, and that Strabo was interested in gardening. He wrote a poem as 'a very poor gift' to the abbott of St. Gall with the title *De cultura*



Plan of doctor's house at St. Gall[8]

hortorum or *About Gardening*.[5] He described his garden in 440 hexameters and wrote that the cure for snake bites was to 'pound lilies in the mortar and drink the juice with Falernian wine'.[6]

He had a facility with his pen for he also wrote an introduction to Einhard's life of Charlemagne in about 820 AD; Einhard had also received much of his education at Fulda, and also at the Palace School set up at Aachen by Charlemagne. The monasteries however were regarded as the real educational centres, even if the monastic life was not to be followed.

If Walafrid were really responsible for planning the three gardens, the small one by the sacristy, the kitchen garden and the herb or physic garden at St. Gall, then more plants should be added to the garden list, as we know the following were grown:

Artemisia abrotanum which we know as 'Lad's Love' used for gout and epilepsy;

Radish (*Raphanus sativus*) which was said to help coughs;

Pumpkins, melons and cucumbers, to 'cool the stomach';

Horehound (*Marrubium vulgare*), also for coughs;

Tansy (*Tanacetum vulgare*);

Chervil (*Anthriscus cerefolium*);

Agrimony (*Agrimonia eupatoria*) for stomach ache;

Betony (*Stachys officinalis*) for wounds and internal troubles;

Celery (*Apium graveolens*); and

Wormwood (Absinthe or Wermut in German), which was useful for headaches and dizziness.

Atkinson has written that the first true gardens for cultivating both economic and medicinal plants were developed as much as 5000 years ago.[7] The uses of Chinese rhubarb were known then and described, and it is reported that Shen Nung grew a species of cinnamon (possibly *Cinnamomum cassia*) in his garden, as well as coriander, orange and pomegranate. In Assyria, the Hanging (terraced) Gardens

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of Babylon became one of the wonders of the world and the cultivation of medicinal plants was encouraged; opium was known to them, as was the use of irrigation.

He goes on to relate that the Anglo-Saxons were acquainted with as many as 500 plants. This may be an exaggeration but the early English world was by no means cut off from new Continental ideas. It was then that Charlemagne was negogiating for the hand of King Offa of Mercia's son. Charles Singer, in his *Medicine in Anglo-Saxon Times*, was very disparaging concerning the medical treatment of those days,[9] but a rather different attitude has of recent years arisen with the increased faith in and use of herbal medicines.

Acknowledgements

I would particularly like to record the helpfulness of the cathedral library staff.

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A Century and a Half of Pharmacy in Trumpington Street, Cambridge

Dr Shirley Ellis

The first reference to an apothecary in Trumpington Street is found in Holden's Directory of 1805 under the name of William Beales, but pharmaceutical influence in the area really starts in 1842. In that year two men joined the newly formed Pharmaceutical Society whose lives, and those of their children, were to have considerable impact on Cambridge for the next 100 years.

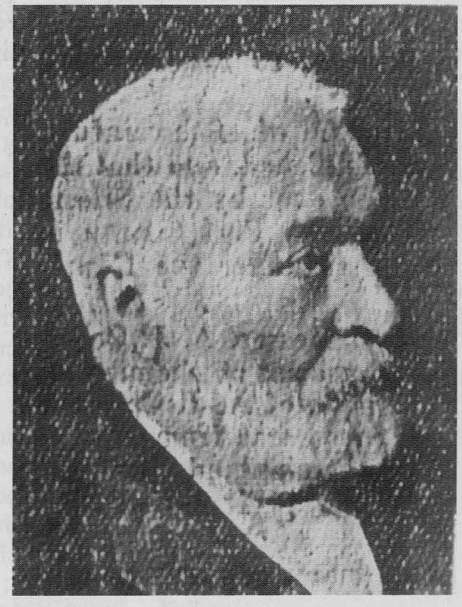
Isaiah Deck came from a family of Cambridge pharmacists, with premises in Market Hill, Cambridge since 1801, and opened his own business in Trumpington Street in 1815. By 1830 his expertise was firmly established and he is described as 'practical chymist and mineralogist' to the Duke of Gloucester, who was Chancellor of the University from 1811 to 1834.

The title of 'mineralogist' is given credence the by his publication in the *Pharmaceutical Journal* of

ISAIAH DECK

1851 of an article entitled 'Coprolites, or Fossil Manure'. He was also a well known figure in the town, especially at New Year's Eve festivities as he introduced the practice of firing two rockets from King's College green, opposite his shop, immediately before and after midnight. He died in 1853, just 9 months after his son, Arthur, had passed the Major examination and become a Pharmaceutical Chemist and a Member of the Pharmaceutical Society.

During the first half of the 19th century the population of Cambridge had trebled and around 1830 Trumpington Street was divided, renamed and renumbered. The Deck pharmacy, at the town end,



Alderman George Peck

became 9 King's Parade and a pharmacy was opened at 35 Trumpington Street by Thomas Cox.

In 1851 this business was taken over by George Peck. He had become an Associate Member of the

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Pharmaceutical Society in 1842, whilst working in Coventry , and now became a full member on the purchase of a business in his home town. The first Register of Chemists & Druggists records both Arthur Deck and George Peck on the basis of their having been in business prior to August 31st 1868 although the latter is recorded as 'George Peek', a spelling error not corrected until 1879 when his first son qualified as a pharmacist from the same address. Arthur Deck also appears in the *Register of Pharmaceutical Chemists* with an examination certificate number of 194.

Alderman Arthur Deck

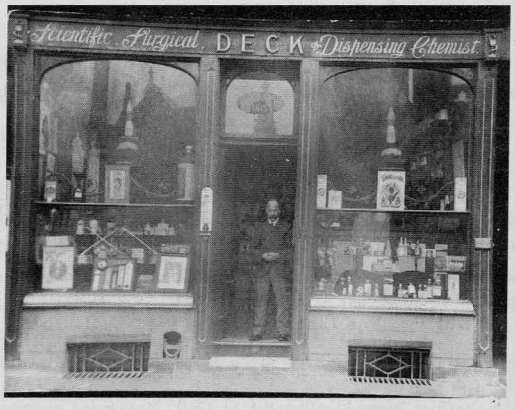
Arthur Deck continued the wide, if somewhat eccentric, interests of his father. As well as continuing the New Year rocket tradition he was a pioneer of hot air ballooning and, as a firm supporter of 'natation', responsible for the erection of bathing huts for swimmers in the Cam. He was also used as an expert on chemical matters, including the analysis of vermin powder during a prosecution for the illegal sale of strychnine by a fellow pharmacist in 1873.

The royal connections were also continued and the business was granted a Royal Warrant by Prince Albert, while he was Chancellor of the University, and subsequently to the Prince of Wales, later Edward VII, who studied there.

Both pharmacists were highly respected within the City of Cambridge and played an active part on the City Council. Arthur Deck was 20 years a Councillor from 1851 and then 28 years an Alderman, serving on committees associated with his interests: pyrotechnics - the fire brigade and later electric lighting; and education - library committee. George Peck joined him as a Councillor in 1896 and became an Alderman in 1902. He put his pharmaceutical expertise to good use by serving on the sanitation and sewage committee. Around the same time his pharmacy became the local sub-post office and he became a Director of the Cambridge Permanent Building Society. His public service was not restricted to the Council. He became a member of the Board of Guardians for St. Mary the Less Ward and a Select Governor of Addenbrookes Hospital which was adjacent to his pharmacy. He was also one of the first to enrol in the new Cambridge Volunteers in the 1870s.

Although George Peck played an active part in local pharmaceutical activities it was Arthur Deck who became the first President of the Cambridge Pharmaceutical Association in 1893, remaining in the post for 8 years. He also served as Town Governor of Hobson's Workhouse and a Trustee of Hobson's Conduit, part of which flowed past both sets of premises.

The two men died within a year of one another and both were succeeded by their sons. Arthur Albert



Arthur Albert Deck outside 9 King's Parade

Deck passed the Minor examination and registered as a Chemist & Druggist in 1884. He opened his own business in St. Andrew's Street, Cambridge in 1896 but in 1898 when his son, Reginald Peck, also passed the examination he handed the business over to him and returned to 9 King's Parade where he remained until 1929. Arthur Albert Deck seems to have concentrated on running his pharmacy but the presence of the barometer/ thermometer outside his premises demonstrates that his service still extended beyond the supply of medicines. The continuing family interest in civic affairs is shown by his donation of the coat of arms, which hung over the pharmacy entrance indicating his royal warrant, to the Borough for use in the Magistrates Court on his retirement.

Three of George Peck's sons qualified as Chemists & Druggists from 30 Trumpington Street and one of them, Ernest Saville Peck, became a Pharmaceutical Chemist in 1889. He was destined to play an important role in the development of pharmacy nationally and the defence of his country, as well as managing the pharmacy after his father's death. He was academically inclined, gaining a Cambridge MA and acting as Secretary and President of the British Pharmaceutical Conference for 15 years. He presented several papers including one on the use of a 'weight burette' for strict accuracy in titration in

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Ernest Saville Peck

1898 and in 1899 one on 'Ferrum Redactum *PB 1898*'. The sketch was drawn at this time. In the same year he became an examiner for the Pharmaceutical Society.

He had followed his father's example and joined the Territorial Division of the Cambridge Regiment, rising to the rank of major. During the first world war his scientific training was put to good use in studying the use of gas in warfare in France. He became the Commandant of the Eastern Anti-Gas School and later went to the United States to instruct troops there on anti-gas measures. He was awarded the Harrison Memorial Medal of the Society in recognition of his work in chemical warfare. After the war he took a personal interest in the future of pharmacy. He gave the inaugural address at the opening of the School of Pharmacy in 1920 and was elected to the Society's Council in 1921. He served on the Council until 1943 and was President of the Society in 1935. He also took a great interest in the history of the profession and was a member of the Society's History of Pharmacy Committee for many years and owned a collection of mortars, later donated to the Society's museum.

Despite his high national involvement he did not neglect Cambridge. He was elected to the City Council in 1924 and served on the public health, maternity and child welfare, and library committees and as Mayor in 1937/8. He also founded a branch of Rotary in Cambridge and acted as Secretary of the Westfield Charity, founded in 1658 for apprenticeships for young people, for over 20 years. In this connection the Cambridge Independent Press for 1931 stated:

> He is a great believer in apprenticeships and co-partnership. Further he practices what he preaches, three of his assistants now sharing with him the responsibilities and management and directorate of his business.

Clearly a man ahead of his time.

In 1929 Arthur Albert Deck sold the pharmacy at 9 King's Parade and retired from active pharmacy. In the same year Ernest Saville Peck converted his business into a limited company - George Peck & Son Ltd. The first *Register of Premises* 1936 showed the company owning three shops in Cambridge: their original shop at 30 Trumpington Street; Mr Deck's old shop at 9 King's Parade; and a third pharmacy in St. Andrew's Street, Cambridge.

Ernest Saville Peck died in 1955 but the company continued in ownership until 1977, when all three shops were sold to Savory & Moore. The pharmacy at 9 King's Parade closed in 1981 and is now the National Trust Shop but the original windows are still in place. 30 Trumpington Street is still a pharmacy and is part of the Lloyd's group.

The shops as they are in 2002: 30 Trumpington Street 9 King's Parade

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(continued from p.49)

Review: Jacques Peschier (1769-1832).

Details of Peschier's genealogy, family life and social standing are discussed before investigating his contributions to science and his membership of and active participation in the leading scientific societies in Geneva. The societies prospered particularly when Geneva joined the Swiss Confederation in 1815. Peschier was stimulated in the company of learned men such as the astronomer and meteorologist Marc-Auguste Pictet, the priest Jean Pierre Etienne Vaucher, the chemist Jean-Baptiste-Andre Dumas and the chemist, physicist and physician Charles Gaspard De La Rive.

In addition to running his retail practice Peschier found time to train new entrants to the profession and details of his chemistry lectures are presented. In his laboratory he also conducted research into chemistry, plant chemistry and the analysis of minerals, mineral waters, gastric juices and urine. His researches are mentioned in the extensive correspondence that he conducted with outstanding scholars of his day, including the notable Erfurt apothecary, professor and natural scientist Johann Bartholemaus Tromsdorff. Peschier's most important activity was undoubtedly the development, production and distribution of Male Fern Extract, (l'oleoresine de la fougère mâle), and he can be regarded as a founder of the industrial production of such remedies.

Apart from the valuable insight into the life of this 18th/19th century apothecary, this book is an enjoyable linguistic challenge as the main script is in German but many of the quotations and letters are reproduced in the original French; excellent summaries are provided in both languages. In addition there are 44 illustrations, 6 tables, archive sources, some 435 literature references and indexes of persons' names and subject matter.

W.E. Court

Review

Steckt eine Allergie dahinter? (Is there an Allergy behind it?)
Ulrich Meyer, 2002. Stuttgart: Wissenschaftliche Verlagsgesellschaft mbH Stuttgart, pp. 485; (ISBN 3-8047-1924-4), price €49.90, SFr 85.90.

With the engaging title *Is there an allergy behind it?* this book is Volume 4 in a series, the Greifswalder Schriften (writings from the northeast German University of Greifswald), on the history of pharmacy and social pharmacy.

Commencing with the early understanding of idiosyncrasy, anaphylaxis and allergic conditions such as hay fever, vasomotor rhinitis, bronchial asthma and urticaria, the author traces the history of allergy therapy before the introduction of the antihistamines. Detailed discussion of the treatment of urticaria with calcium salts in the 19th century provides much information on the commercially available preparations and refers to strontium therapy and, in particular, to Calcium-Sandoz.

A detailed account of the discovery and exploitation of the antihistamines follows, starting with the 1940s histaminase preparation Torantil (IG Farben) and the first usable synthetic antihistamine, phenbenzamine (Antergan), developed through the cooperative efforts of the Pasteur Institute and Rhône-Poulenc scientists in the early 1940s. Despite problems due to the Second World War (1939-1945), further work on phenothiazines led to promethazine (Phenergan) in 1945 and later the neuroleptic chlorpromazine (Largactil).

The development of antihistamines by the German firms IG Farben, Hoechst, BASF and Bayer is described in detail and the story proceeds with consideration of the development, manufacture and retail trade in antihistamines in the German Federal Republic involving the firms Merck, Knoll, Chemiewerk Homburg, ASTA, Schering, Promonta and DIWAG. Reference is made to discoverers, pharmacology, formulations and commerce.

The role of the Swiss pharmaceutical firms Sandoz, Hoffman-La Roche and Ciba-Geigy in the development and production of a range of effective medicines is followed by a similar consideration of the contribution of the firm VEB Deutsches Hydrierwerk Rodleben and some other manufacturers in East Germany.

This excellent volume is dedicated to the memory of Roger Ernest Collingwood Altounyan (1922-1987), British physician, wartime bomber pilot and asthma, pollen and animal hair allergy sufferer, who joined Benger Laboratories (subsequently Fisons) in 1956 and held clinics for asthma sufferers in Monsall Hospital, Manchester. Altounyan was the 'human guinea pig' who bronchially challenged himself some 3000 times during the search for disodium cromoglycate (Intal) and related mast-cell stabilisers. This book describes his work and is rightly dedicated to this underrated British medical scientist.

Finally the development of non-sedative antihistamines is considered and an appendix of 37 biographies of scientists participating in this story is provided. In addition to a good German summary, this book offers 12 plates, 32 illustrations, 16 tables, 104 formulae and copious footnotes throughout the text. The indexes include unpublished archive sources, unpublished works, replies from firms and public bodies, private communications, authorised reports, oral announcements, abbreviations and some 1650 references. With its careful use of numerous original sources this well produced volume provides an important contribution to the history of allopathic medicine production.

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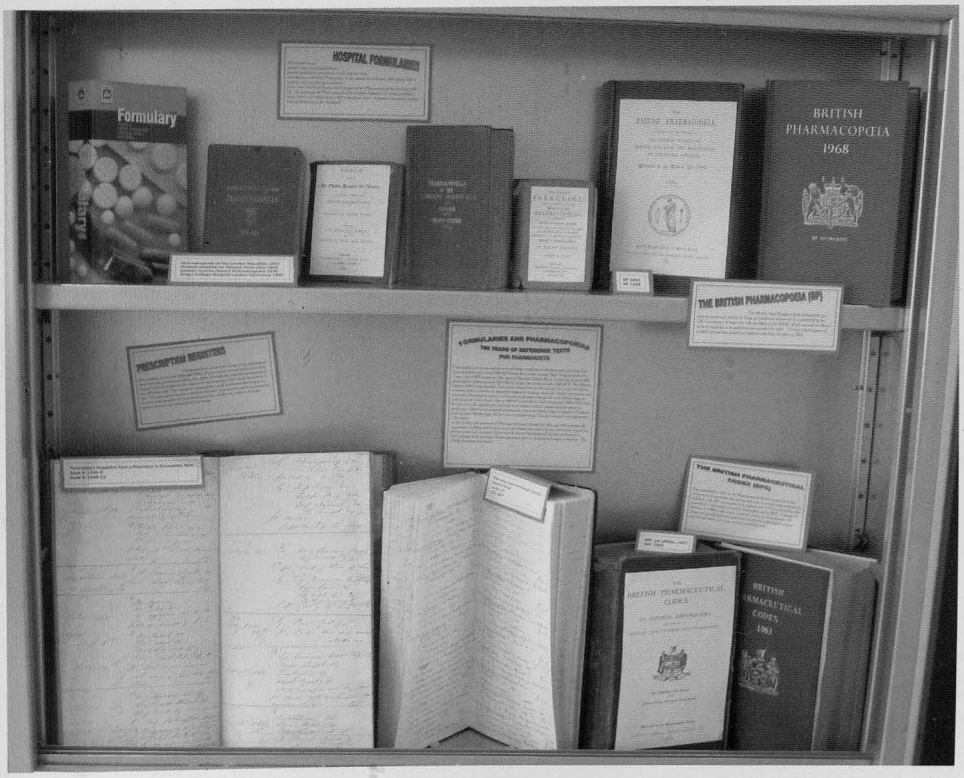
Formularies and Pharmacopoeias

Dr Alan Nathan of King's College Department of Pharmacy has arranged this historical display of pharmaceutical reference texts in the Department. He was helped by Ms Arma Yacoob, a 6th form school student, working on a four-week vacation scholarship funded by the Nuffield Foundation.

The display, shown left and below, is intended for visitors and students. Many of the books were bequeathed to the Department by Douglas C. Harrod, a former member of staff and a noted pharmaceutical historian.

The display shows examples of reference texts used by pharmacists over the last 150 years and prescription registers from the 1840s, with labels describing their history. It includes the *British Pharmacopoeia, British Pharmaceutical Codex, Martindale: The Extra Pharmacopoeia, National Formulary, British War Formulary, BNF*, 19th and 20th century hospital formularies, *ABPI Data Sheet Compendium, Monthly Index of Medical Specialities* (MIMS) and *Pharmaceutical Formulas* (C&D). History is brought up to date with CD-ROMs of e-MIMS and the latest edition of Martindale (33rd edition).



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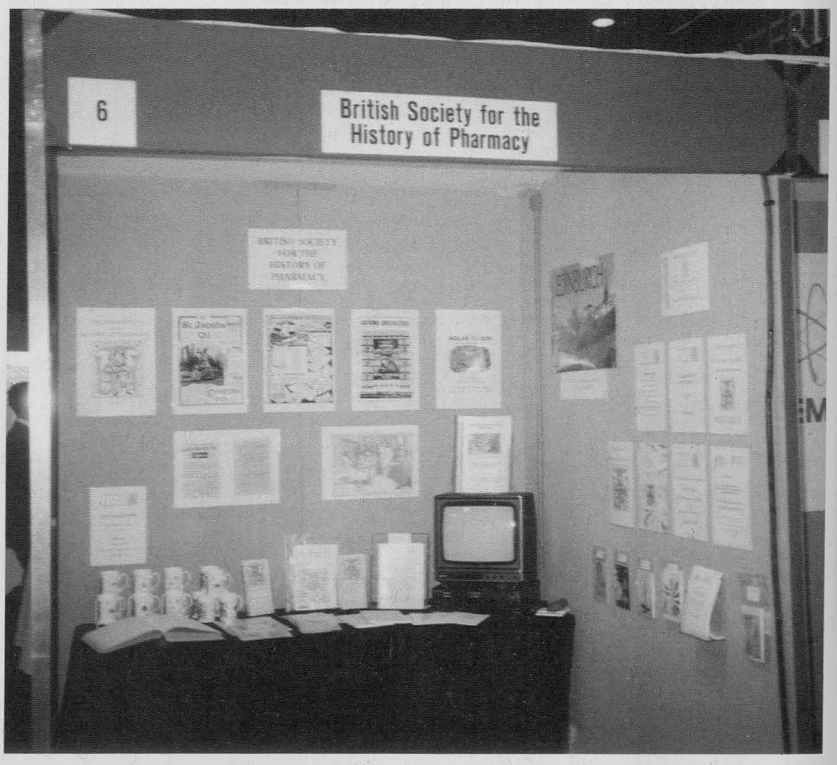
BSHP stand at the British Pharmaceutical Conference in Glasgow, September 2002
Above: Christine Homan (left) and Peter Worling talking to two visitors



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